

MONITORING TIMES

A Publication Of
Grove Enterprises

MONITORING THE GULF WAR

A DC-to-Daylight Guide to
Radio Listening

Completely Revised!

English Language Shortwave
Broadcasts to the World

Plus
Scanning News, New Equipment



0891

21-

ULTIMATE HANDI-COUNTERS™

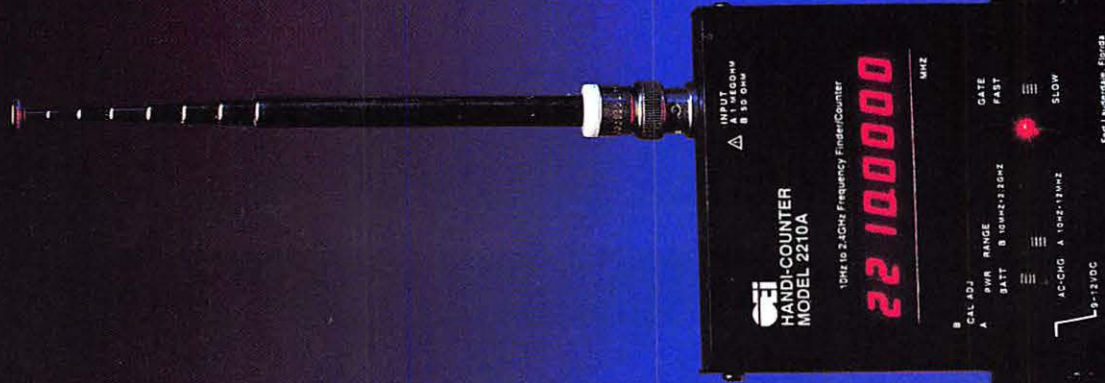
No other counter can compare to OPTOELECTRONICS' 10Hz to 2.4GHz HANDI-COUNTERS™. Performance, Sensitivity, Quality packed in a compact size...to go anywhere you need to go.

- 2210A Full Range Pocket Size LED. \$239.
- *8030 Bench Portable (fits in an attache case) with all the HANDI-COUNTER™ features plus *more*. \$579.
- *3000 Top of the line Universal Handi-Counter™. \$375.

*Pictured below with optional Back-Light/Beeper.

OPTOELECTRONICS

Toll free order line: 1-800-327-5912
FL(305)771-2050 • FAX(305)771-2052
5821 NE 14th Avenue, Ft. Lauderdale, FL 33334



OPTOELECTRONICS

MONITORING TIMES

War in the Middle East by Larry Van Horn

6

Now into its first month, the onslaught of military activity in the Persian Gulf has brought with it an entirely new set of monitoring frequencies. Experienced broadcast and utility listeners alike have been deluged with inquiries from friends, neighbors, the press, and even from soldiers in the field -- "Where can I listen to find out what's going on?"

In this exclusive report from columnist Larry Van Horn, *MT* leaves no base uncovered in a complete, up-to-date summation of monitoring the Persian Gulf conflict.



Border radar on the Rio Grande: Harry Baughn

DRUG WAR

Monitoring by William Shelby

14

On a different but no less serious front, another war is being fought. Part two of William Shelby's report on the battle against drug traffickers focuses on the increasing role of the military and other government agencies in interdiction. With the addition of the most complete list of frequencies and call signs ever published, this deadly game can be followed from the security of your armchair monitoring post.

Cellular Phone Hopping by Bruce Heatley

18

We all know that given the right receiver (even a television, as Bob Kay reminds us), cellular phone calls are easily overheard. The thing is, you would only get a fragment of a conversation, since the caller is presumably mobile and would soon be passed to some unknown frequency a few blocks over. Impossible to follow -- isn't it?

Bruce Heatley just couldn't resist the academic challenge. What if you knew all the adjacent cells and their frequencies, and you knew which cell the caller was starting from ?



Motorola

Man: The Human Receiver by Bob Grove

22

Nerves frazzled? Concerned about the causes of "modern" illnesses such as new forms of cancer? You're not alone. Although no one will agree whether our increasing exposure to electromagnetic radiation has any direct bearing on mankind's mental or physical state, it has been a subject of intense interest and study since the turn of the century. While there's a lot we don't know, what we do know may surprise you.

Rika Kobayashi

26

On her way to a sociology degree, this capable young woman found herself on the English service staff of Radio Japan. She's been making herself indispensable ever since. You'll enjoy this station personality profile by Jeff Chanowitz.

And More...

Just prior to the eruption of the Gulf War, Monitoring Times and its staff were receiving a lot of attention on an issue of domestic concern -- the monitoring of cordless and cellular phone calls and its legality/morality. One's legal, the other's not, and whether it's moral ... well, you decide. Bob Grove has a lot to say on the topic in "Eavesdropping" on page 104. Bob Kay enjoyed running detours around the media in their obvious search for sleaze, page 36, but then wondered if his was the right choice. It's a matter of ongoing concern, to MT and ultimately, to the lawmakers.

You have all responded enthusiastically to the newly formatted shortwave broadcast section of Monitoring Times, and we appreciate the encouragement. But we're not done yet. A section this comprehensive isn't easy to revamp in just one month. You'll continue to see improvements, but this month the primary change is in our approach to the frequency listings. No longer will you be limited to the powerhouse favorites like Voice of America, Deutsche Welle, etc. We are headed toward all-inclusive listings that will give you the little guys alongside the major broadcasters, and will list all English language broadcasts regardless of target areas. We hope the section beginning on page 62 will continue to be your most useful and reliable monitoring tool.

Inside this issue you'll find much, much more -- projects, tutorials, and product reviews; It's nice to know some things remain reliable in a most unusual month!



MONITORING TIMES

MONITORING TIMES (ISSN: 0889-5341) is published monthly by Grove Enterprises, Inc., Brasstown, NC, USA.

Address: P.O. Box 98, 140 Dog Branch Road, Brasstown, NC 28902

Telephone: (704) 837-9200

FAX: (704) 837-2216 (24 hrs)

Subscription Rates: \$19.50 in U.S. and \$28 elsewhere; Label indicates last issue of subscription

STAFF

Publisher

Bob Grove, WA4PYQ

Managing Editor

Larry Miller

Associate Editor

Rachel Baughn

Subscriber Services

Beverly Berrong

Typist

Elsa Kerschner

Advertising

Beth Leinbach

Dealerships

Judy Grove

Editorial Staff

Frequency Manager Greg Jordan

Program Manager Kannon Shanmugam

Program Monitors John Carson

Jim Frimmel

Reading RTTY Jack Albert, WA9FVP

Beginner's Corner T.J. Arey, WB2GHA

Exp Workshop Rich Arland, K7YHA

Plane Talk Jean Baker

DeMaw's Workbench Doug DeMaw

SW Broadcasting Glenn Hauser

High Seas James R. Hay

Scanning Report Bob Kay

Propagation Report Ike Kerschner, N3IK

Magne Tests... Lawrence Magne

Federal File Rod Pearson

Satellite TV Ken Reitz, KC4GQA

Outer Limits John Santosuosso

Antenna Topics Clem Small, KR6A

SW Broadcast Logs

QSL Corner Gayle Van Horn

Utility World Larry Van Horn,

N5FPW

American Bandscan Karl Zuk

Correspondence to columnists should be mailed c/o Monitoring Times. Any request for a personal reply should be accompanied by an SASE.

Second class postage paid at Brasstown, NC, and additional mailing offices.

POSTMASTER: Send address changes to Monitoring Times, Post Office Box 98, Brasstown, NC 28902.

DEPARTMENTS

Letters	3	The QSL Report	54
Communications	4	Reading RTTY	55
Shortwave Broadcasting	28	Outer Limits	56
Utility World	32	Shortwave Guide	58
The Scanning Report	36	Magne Tests ...	88
What's New?	40	Scanner Equipment	90
DX Ham Tips	43	DeMaw's Workbench	92
The Beginner's Corner	44	Experimenter's Workshop	94
The Federal File	46	Antenna Topics	96
High Seas	48	Ask Bob	98
American Bandscan	50	Convention Calendar	101
Satellite TV	52	Stock Exchange	102

LETTERS

"This morning, while in the Red Sea aboard the USS *Seattle* (AOE-3), we had a little problem. The ship's radio officer was trying to get news of the previous night's attacks on Iraq. Unfortunately, he could not seem to bring in any stations.

"When I heard about this I offered him my copy of *Monitoring Times*. Well, he used it and now we are receiving great news reports from the BBC and other stations around the world -- thanks to your magazine.

"Yes," says John DesJardins, "*Monitoring Times* is on the front lines of Operation Desert Storm."

Thanks, John. That's a really neat story.

PS1 Patrick Kerrigan is another reader now doing duty in the Middle East. He says that he didn't have room in his bags for a shortwave receiver when he shipped out to Saudi Arabia. Pat is assigned to port security for Navy ships and cargo vessels but is currently filling out the duties of radio officer.

"I do have a small Sony radio and listen to 'Shield 107 FM.' I also hear the Voice of America on AM, frequency unknown, and several bubbler-type jammers."

"Other than that," says Pat, "the routine is boring but livable. If anyone wants to write to me, here's my address: PS1 Patrick Kerrigan, USCG, PSU 302, COMPSHDGRU ONE, A.S.U. Box 504, F.P.O. New York, NY 09526-2800. Also, if anyone wants to send me a small portable shortwave, that would be great."

We've received a number of letters from readers who are now stationed abroad. Only Pat has authorized us to pass along his name and address. Let's flood him with letters. Let's flood the others with our prayers and good wishes for a safe and speedy return.

Gjerry Beryolet of Minneapolis, feels that *Monitoring Times* has been promoting the war. He says that "I have noticed your 'flag waving,' pro-military bias in the last few issues. In fact," he continues, "practically any mention of a communist or socialist government seems to be followed by some sort of derogatory remark. Your politics is showing!"

You know, I've been editing this magazine or its predecessor for some ten years now. During that time I have

been accused of virtually every type of political, social and even sexual alliance. It wasn't all that long ago that, after running an article on Nicaraguan radio by Swedish journalist George Wood, that many people were apparently convinced that we were card-carrying communists. I guess it's only natural that the pendulum would swing the other way.

For the record, *Monitoring Times* has no hidden political, social or -- no kidding, we've been accused of this -- sexual agenda. Our publication is about radio -- its foibles and its triumphs. We report, in part, on international radio and in telling you what you can hear, we are going to reflect what's happening in the world. Several years ago, that happened to be Nicaragua and the perspective was through the eyes of a Swedish journalist. Right now, it's the war in the Persian Gulf and it happens to be through the eyes of some people who are serving there.

It's not our job to tell our authors how they see it. You're going to get different views depending on the author. Then again, you'll get different views depending on the station you tune in. But isn't that why people listen to worldband radio?

Yes, from time to time we poke at someone or something that obviously deserves it. A case in point is the recent admission by Albanian journalists that they had not been entirely truthful in their reporting over the past twenty

[Please turn to page 100]



The work of an irate listener who trashed the studio? More on page 100.

Now Get It Even Faster!

Use Your Mastercard or Visa
Call the DX Radio Supply
24-Hour Order Recorder™
215-273-7823



GULF WAR WHITE PAPER
Steve Douglass' 20+ page tuning guide to the war in the gulf. Includes military and broadcast frequencies plus other helpful info. \$9.95 plus .80 first class shipping.



PASSPORT TO WORLD BAND RADIO An indispensable guide to the shortwave bands -- 176 pages of frequency info alone! Articles, receiver reviews. Made in the USA! \$16.95 plus 1.70 book rate shipping or 3.10 UPS.



1991 WORLD RADIO TV HANDBOOK Covers shortwave, longwave, AM, FM, TV worldwide. Each listing contains station schedule, languages, address, transmitter power, etc. \$19.95 plus 1.70 book rate or 3.10 UPS.

*Get Our Complete Catalogue
— just 25 cents!*



TOP SECRET REGISTRY OF US GOVERNMENT FREQUENCIES 240 pages of 25 to 470 MHz (scanner) frequencies for tuning in everything from the military to the FBI and dozens of others. Also includes "how to" articles. By Tom Kneitel. \$19.95 plus 1.70 book rate or 3.10 UPS.

DX Radio Supply

The Original Radio Bookstore

Mastercard and Visa orders only: 215-273-7823 or send check, money order, cash, Mastercard or Visa to Box 360, Wagontown, PA 19376. PA res. add 6% sales tax. See our catalogue for terms and conditions.

Middle East Sparks Radio Rumors

It's amazing what neuroses spring forth during conflicts; Operation Desert Storm is no exception. The FCC is getting deluged with inquiries from hams asking about special operating conditions. In fact it's business as usual for hams--they can even talk to Iraqi hams if they find any!

Concerning a computer bulletin board rumor, Tom Kneitel, editor of *Popular Communications*, is not dead, nor has he been arrested for passing out federal and military frequencies on a local amateur repeater! Tom tells us he has never been on a repeater, hasn't operated his SSB ham equipment (call sign K2AES) since last September, well before the Middle East crisis bloomed, and has not been contacted by authorities about any Middle East monitoring infractions.

Further grist for the rumor mill: FCC attorneys have informed us that there is no mandate to crack down on shortwave or scanner listeners who discuss frequencies they have monitored related to American and Allied communications (these are well known).

Finally, a "stop the war" coalition which has invaded computer bulletin boards, urging loggers-in to call a profit-generating 900 number, is being investigated by the FCC for this unlawful method of revenue soliciting.

On the other hand, it *does* appear to be true that production of the newly-introduced AOR scanner models AR3000 and AR2500 have been totally committed to tactical intercept applications in jet fighters for monitoring enemy radio. By law, national defense has first priority.

Electricity Causes Cancer: Yes or No?

A draft report by the U.S. Environmental Protection Agency has concluded that there is indeed evidence of a possible link between cancer and low-level electromagnetic fields caused by power lines and appliances.

Later, officials for the EPA were quoted in the *New York Times* as saying that, although they have no firm evidence that such a link exists, there is

enough evidence of a problem to warrant further research.

Several days later, Dr. F. Kristian Storm III, former chairman of the American National Standards Institute, called the suggestions contained in the EPA draft "irresponsible" and said that there "is no link between electromagnetic radiation and cancer."

From 1982 to 1987, Storm oversaw the committee that investigated the risk caused by the electromagnetic radiation emitted from most electrical sources, ranging from high-tension lines to electric blankets. That committee found no evidence whatsoever that low-level electromagnetic radiation caused cancer. He is currently chairman of the surgical oncology department at the University of Wisconsin at Madison.

For another point of view, see "Man, the Human Antenna," on page 22 of this issue.

Special Events Station

The M.D. Anderson Cancer Center Amateur Radio Club in Houston, Texas, will be operating KK5W for 50 consecutive hours beginning 2200 UTC on 12 April and ending at 0000 April 14th. Operations will be in the General portions of 80, 40, 20 and 15 meters and in the Novice portion of 10 meters. The event is part of the celebration of the Center's Golden Jubilee (1941-1991).

For a certificate, send your QSL and a self-addressed, stamped envelope to KK5W, M.D. Anderson Cancer Center Amateur Radio Club, 1515 Holcombe Blvd, Houston, Texas 77030. There is no specific procedure for non-hams to participate; however, a reception report will usually suffice in place of a QSL card.

Public Fight

The very public year-long feud between the Voice of America's Richard Carlson and the head of its parent organization, the U.S. Information Agency's Bruce Gelb, has apparently come to a head.

Gelb, whose tenure the *Washington Post* says was "marked by almost continuous controversy," has accepted a White House offer to become ambassador to Belgium. According to some sources, Gelb's decision to accept the diplomatic position is tied to a

demand that Carlson be shifted from his job at VOA.

At one point, the two men, both of whom are charged with promoting a positive image of the United States overseas, locked horns in front of a standing-room-only audience of USIA and VOA employees. Gelb, according to reports, has tried to have Carlson, a multi-millionaire former broadcaster, fired on at least two occasions.

Henry Catto, ambassador to Britain, is expected to replace Gelb at the USIA.

FCC Raids Net 144

The U.S. Federal Communications Commission (FCC) conducted a nationwide raid that netted them a reported 144 unlicensed shortwave radio operators. These operators were found to be illegally transmitting on frequencies adjacent to the Citizen's Band (CB) and 10 meter ham bands. The operation involved personnel from all 35 Commission field offices and brought in some \$147,000 in fines.

Unlicensed transmissions were found in all 50 states plus the District of Columbia and Puerto Rico. The 25 to 28 MHz frequencies are allocated for business and ham use. Rumors that the raid was part of a "frequency clearing" act ordered by the Pentagon in anticipation of Operation Desert Storm were denied by officials.

Meanwhile, the FCC has decided to suspend the General Radiotelephone Operator License of Frederick K. Stark. Stark was "busted" on December 17, 1989 while operating classic music station WNYS out of his home in West Taghkanic, New York. Stark was originally fined \$1,000 as well but the levy was cut to \$100 because, according to the Commission, Stark "cooperated." The story of Fred Stark's pirate radio station was reported by Don Bishop in the May 1990 issue of *Monitoring Times*.

VOA Vet Killed

A veteran engineer with the Voice of America suffered a cardiac arrest when he received a 6,000 volt shock from a transmitter he was working on. According to unofficial reports in *Radio World*, Dallas Cox, a 20 year employee of the Voice, was called upon to check

COMMUNICATIONS

one of the 10 transmitters at the station's Greenville, Ohio, relay site.

Cox reportedly entered the transmitter after turning off the voltage but allegedly did not turn off the filament supply. While inside the transmitter, he apparently made contact with some equipment that was still charged.

Cox's death was the first accident in the history of the Greenville site.

Man Charged with Fake SOS

A man caught by the U.S. Coast Guard allegedly broadcasting a false SOS was indicted under a new federal law that prohibits fake distress calls.

Benjamin Acardo James pleaded innocent at his arraignment on federal charges of sending a bogus distress message, impersonating a U.S. Customs official and making false statements over the radio. Bail was set at \$10,000.

James, 40, faces up to six years in prison and a fine of \$5,000 for a prank in which he allegedly called the Coast Guard, saying that he was a U.S. Customs officer aboard a boat on the high seas and that 25 people, many of them children and non-English speakers, had surrounded his boat. Some were in life rafts and others in the water and he feared that they would overload his boat.

Unable to locate the position off Miami, the Coast Guard began to search elsewhere. Eventually, Coast Guard officer Troy Brown said that he spotted James in the doorway of a 35 foot boat moored on the Miami River, with a microphone in his hands. Brown then radioed headquarters and asked them to call the alleged Coast Guard official back. James responded and was arrested.

Government Frequencies Go to Business

Lawmakers are working on a bill that would reallocate some 200 MHz of government radio frequency spectrum for business to use in developing emerging technologies. An earlier version of the bill passed the House last year but the Senate failed to act on it before the end-of-the-year scramble.

The new bill, called the Emerging Telecommunications Technologies Act of 1991, gives the Commerce Department up to two years to sort out

which 200 MHz of frequency space would be given up to industry. The FCC would then have 15 years to reallocate the frequencies to commercial users.

Rocketing with Russia

A U.S. telemarketing firm is offering a one week stay aboard the Soviet Space Station MIR as a prize in their "900" number telephone contest. According to reports, you obtain your entries in the sweepstakes by calling 1-900-258-2MIR. The call costs \$2.99. The lottery will supposedly run until the end of the year with winner being chosen sometime in December.

Radio buffs who would rather keep their feet on the ground can use their scanners to tune in 145.55 (FM) to hear the space shuttle. An outside antenna will increase the likelihood of hearing cosmonaut Musa Manarov, U2MIR, or other space travelers on board the ship.

TV Marti Takes Off

TV Marti, the controversial program designed to broadcast news, sports, comedy and political programming to Cuba, broke loose from its mooring and landed in a mangrove forest near the tip of the Florida peninsula.

The tethered Air Force blimp -- nicknamed "Fat Albert," broke free after it was being lowered for maintenance. The tether broke at about 3,000 feet and, according to station officials, "it just went its own merry way." Antonio Navarro, director of the Office of Cuba Broadcasting in Washington said, "I called my wife in Miami and told her to look out for the balloon."

There are no estimates on how long it will take to get TV Marti operational again.

Thanks and credit to: Dave Alpert, New York, New York and Cyprus; Anonymous, Anytown, USA; Don Bice, St. Petersburg, Florida; Alton Coffey, Grand Prairie, Texas; *Electronic Engineering Times*; Robert E. Enebelly, Imo State, Nigeria; Mark Gribble, Alexandria, Virginia; Karl Heil, Blue Mound, Wisconsin; Allan D. Hislop, Lawrence, Massachusetts; Kevin John Klein, Appleton, Wisconsin; Steve Rogovich, Virginia Beach, Virginia; *W5YI Report*.

Computer Control of Your Radio

with
SCANCAT
Computer Aided Software control of:
Kenwood R-5000 & TS-440
Yaesu FRG-9600 & FT-757GX
NEW! AOR - 3000 !!!

Greatly enhance all your radio's functions with software control. PLUS our program includes a built in terminal program for your TNC to instantly go between scanning or terminal modes. Pop-up menu windows and help screens. Fully menu driven and user friendly. Supports color & B&W monitors. Log found frequencies to disk files (Auto Log with AOR3000 !!!), complete with descriptions. Up to 500 frequencies per file. Unlimited disk files that save Description, mode and comments of each frequency. Scan disk files or between frequencies with variable delays and programmable step rates. Search disk files by descriptions, programmable lock outs. 30 programmable presets accessible by a single keystroke. Requires MS-DOS, 1 serial port & interface (not included).

\$49.95 FPD
Visa - Mastercard or COD
Includes "top200" Frequency file N/C
Fully operational demo \$5.00 (refundable with purchase)
J & J Enterprises- 4001 Parkway Dr.- Bossier City, LA 71112
PH. 318-631-3081 (10-5) or 318-746-8408 (5-9) PM CST

High Performance 800MHZ

- Enjoy the best possible reception
- Hear signals other antennas miss
- Astounding performance outside
- Hear 10 times more signals when mounted directly on scanner

Only **\$19.95**

- Free shipping (Continental USA)
- Money back guarantee

MAX System™
GROUND PLANE ANTENNAS
CK-MO-MC-VISA Accepted (MA add 5% sales tax)

Send payment to: Cellular Security Group,
4 Gerring Rd., Gloucester, MA 01930
Or charge by phone: (508) 281 8892

Receiver Multicoupler
for
Multiple Signal Monitoring in
Mobile Radio / TV Network



WI-COMM ELECTRONICS INC.
P.O. Box 5174, MASSENA, N.Y. 13662
(315) 769-8334

MOVING?

Send notification of your new address as soon as you know it so you won't lose a single issue -- or have your 2nd class mail forwarded.

WAR IN THE MIDDLE EAST

by Larry Van Horn
MT staff writer

Since the August 2, 1990, invasion of Kuwait, my shack has been devoted to listening for activity from the Middle East. Nightly vigils and many hours of listening have transpired since the start of the invasion. I have followed the story using every means I could via HF radio, scanners and satellite communications.

As the deadline for Iraq to leave Kuwait came and went, I doubled my efforts to be one of the first to monitor the start of the conflict most of us knew was coming.

You might be surprised what announced the start of the war to me, when it finally came. The time was 2345 UTC and the frequency was on SAC channel S-393/11243 kHz. The operator's voice was very slow, very deliberate and very methodical. It was even eerie sounding in some respects...

"Charlie Five India Seven Charlie November, I say again"

...and the message was repeated again very slowly with a lot of echoes indicating many relay sites were being used.

I knew something was up. I had not heard a SAC operator ever repeat a message in this manner in 25 years of listening. My instincts told me that war had begun in the Persian Gulf.

That was 30 minutes before the TV networks broadcast to the world that the Allied coalition had attacked Baghdad. The EAM message that I heard was also broadcast on a variety of other USAF military frequencies with the same tone and demeanor.

My worse fears were confirmed as reporters from all the networks checked in to tell the world of the initial bombing at Baghdad. Soon most of those reporters would be gone from our television sets, and shortwave radio would be the world's ear to the "War in the Middle East."

In the days that have followed, many surprises have awaited those of us equipped to monitor the different aspects of the war. Just about every form of communications monitoring from all over the spectrum have been used to tell the story of the conflict. The most frequent method being used is the



Photo by Steve Douglass

Search and Rescue operations in the Gulf can be heard on 5680 USB.

monitoring of shortwave broadcasters.

The focus of shortwave broadcast listeners initially was to hear Radio Baghdad transmissions. This was evidently the focus of coalition air forces as well. By knocking out power plants, the transmissions from the power hungry transmitters of Iraq were reduced in signal strength during the opening days of the war.

Shortwave listeners also chased Radio Baghdad's weak signal all over the shortwave spectrum. It appears that the shortwave broadcaster was trying to outrun jamming, interference and allied military aircraft trying to disrupt the shortwave broadcast.

The latest information on Iraqi broadcasting comes from the BBC Monitoring Service. Radio Baghdad, the external service, and the Voice of Peace (directed to the Allied troops) are both apparently off the air as of this writing. The last time Radio Baghdad was heard in Europe was the 2100 UTC English broadcast on January 19.

For those listeners who are not aware, "The Voice of Peace" is the clandestine station put on the air by Saddam Hussein, beamed to the U.S. troops in the Middle East. In one recent broadcast from Baghdad Betty, Iraq's equivalent to World War II's Tokyo Rose, this

warning was broadcast to members of the American armed forces:

"While you are here, your wives and girl friends are dating American movie stars. Movie stars like Tom Selleck, Paul Newman and Bart Simpson!"

According to informed sources, Radio Baghdad's SW transmitter site within Iraq had 16 500 kW transmitters and its own electrical generating plant. Prior to the allied attack on Iraq, DOD sources confirm this site was reportedly operating at only 60% of its capacity. Based on the above information, the on-site electrical plant has now probably been damaged or destroyed.

BBC Monitoring Service reports also indicate that Iraqi Radio's Home Service has been combined with the Voice of the Homeland program and is being transmitted over four or five MW transmitters from within Iraq and via the captured Radio Kuwait transmitters on 6055 and 11990 kHz. It is also being transmitted on 17940 and 15600 kHz when the Allied clandestine station, Voice of Free Iraq, is off the air. Baghdad's Home service programming can also be heard on 8350 kHz. This is apparently a feeder to the Radio Kuwait transmitter site.

Tonight, as I type this article, the 6055 and

11990 kHz broadcasts are quite loud with the best signals here in the southern U.S. since the start of the war. A note of interest to listeners: I heard a lot of bubble jamming on both frequencies, I assume by coalition forces. The 15600 frequency was also being heavily interfered with by an unidentified utility band MUX signal. I noted the Home service at 2300 UTC, but by 0000 UTC all signals were being heavily interfered with. I noted a sign off with anthem at 0019. I did notice that a AM carrier signal was still on 8350 kHz; however, it experienced heavy ute interference.

A Media Network correspondent in Cyprus, several utility band monitors and personal monitoring by the author indicate that the Iraqi News Agency's radio teletype broadcasts of news have not been heard since the Allied attack began.

A clandestine station, The Voice of Free Iraq, appeared on January 1st. The station says it is broadcasting to Iraq on one medium wave and three shortwave frequencies contributed by the radio services of Syria, Egypt, Saudi Arabia, and the Gulf Co-operation Council states.

BBC Monitoring says it can be heard from approximately 0330-0805 and 1430-2020 UTC on 17940, 15600, and wandering between 9560 and 9570 kHz. Richard Langley in New Brunswick has heard jamming on all three frequencies, and Radio Baghdad's General Service has been heard on both 17940 and 15600 kHz.

Egypt has made its medium wave transmitter on 1107 kHz available to an exiled Radio Kuwait, and BBC Monitoring reports this is on the air between 1800 and 2100 UTC.

One the second evening of the war, radio listeners got a taste of a live missile attack. During the evening 0100 English transmissions to North America, Kol Israel announcers interrupted regular scheduled broadcast to sound the alert of an impending missile attack.

"Air Raid sirens are sounding. All residents of Israel are to put on their gas masks and head for their sealed rooms. Do not go to a bomb shelter..."

The alert continued throughout the broadcast and was repeated even into the 0200 English broadcast.

A reporter from local TV station WDSU, channel 6 was in my shack during the 0200 English broadcast from Kol Israel. After hearing the broadcast live from Israel, he said that a shortwave radio would be high on his future want list. During the broadcast the man in charge of Israel's civil defense came on and

SHORTWAVE BROADCASTS FROM THE MIDDLE EAST Table One

Country		UTC Times	Frequencies (in kHz)			
Israel	Kol Israel	0000-0030	11605	9435	7465	
Israel	Kol Israel	0100-0130	11605	9435	7465	
Egypt	R. Cairo	0200-0330	9675	9475		
Israel	Kol Israel	0200-0230	11605	9435	7465	
Iraq	R. Baghdad	0230-0430	11830	11810	11860	
UAE	R. Dubai	0330-0400	15435	15400	13675	11945
Turkey	V O Turkey	0400-0450	178880	9445		
Israel	Kol Israel	0500-0515	17575	11655	11605	9435
			7465	7410		
UAE	R. Dubai	0530-0600	21700	17865	17830	15435
Lebanon	V of Hope	0600-1000	6280	6215		
UAE	R. Dubai	1030-1055	21605	17865	15435	15320
Iraq	V. of Peace	1100-1400	11860	21675	15505	
Israel	Kol Israel	1100-1130	21790	17590	17575	15650
			11585			
Iran	R. Tehran	1130-1225	11940	11790	11715	9705
			9575			
Jordan	R. Jordan	1200-1415	13655			
Egypt	R. Cairo	1215-1330	17595			
Turkey	V O Turkey	1330-1400	17785			
UAE	R. Dubai	1330-1400	21675	21605	15435	15320
Jordan	R. Jordan	1420-1730	9560			
Lebanon	V of Hope	1430-1600	6280	6215		
S Arabia	BSKSA	1600-2100	9720	9705		
UAE	R. Dubai	1600-1640	21675	21605	15400	15320
			13675	11795		
Egypt	R. Cairo	1630-1830	15255			
Iraq	V. of Peace	1700-1900	11860	21675	15505	
Israel	Kol Israel	1800-1815	11655	11585		
Libya	R. Jam.	1800-1900	15450			
Algeria	R. Algiers	1900-2000	15215	9685	9510	
Iran	R. Tehran	1930-2030	9022	6030		
Israel	Kol Israel	2000-2030	17630	11605	9435	7465
Lebanon	V of Hope	2000-2300	6280	6215		
Syria	R. Damascus	2005-2105	12085	9950	15095	
Egypt	R. Cairo	2030-2200	15375			
Iraq	R. Baghdad	2100-2300	13660			
Iraq	V. of Peace	2100-2300	11860	21675	15505	
Turkey	V O Turkey	2100-2150	9795			
Syria	R. Damascus	2110-2210	12085	9950	15095	
Egypt	R. Cairo	2115-2245	9900			
UAE	V of UAE	2200-2400	15100	9600	6170	
Israel	Kol Israel	2230-2300	17575	11655	11605	9435
			7465			
Libya	R. Jam.	2230-2400	7245			
Turkey	V O Turkey	2300-2350	17880	9685	9665	9445

urged people to call their local CD office to report damage or injuries. They even gave the phone numbers in Israel to call.

The first Kol Israel broadcast that mentioned the missile attack in more detail was their 0500 UTC news bulletin, which quoted the Israel ambassador to the US and his comments on Israeli retaliation (when and where). No mention was made of the (unconfirmed) report that Israel had

scrambled an F-15 which was on its way to Baghdad before the US convinced them to turn back.

According to published reports The Voice of Israel and Israel's IDF Radio (Galei Zahal) had prepared for emergency broadcasts. In a report from Tel Aviv relayed by BBC Monitoring, the moment a state of emergency was declared, the two stations merged into one network, to be called the

**USAF GLOBAL
COMMAND AND CONTROL SYSTEM
Table Two**

Albrook AB, Panama	18019	15015	11176	8993	6683	3137
Andersen AB, Guam	18002	13201	11176	8967	6738	4721
Ascension Aux AF	15015	13244	11176	8993	6750	
Clark AB, Philippines	23227	18002	13201	11176	8993	6738
Croughton AB, England	13214	11176	9011	6750	5703	3067
Elmendorf AFB, Alaska	13201	11176	8989	6738	3081	
Hickam AFB, Hawaii	18002	13201	11179	8964	6738	4729
Incirlik AB, Turkey	23227	15015	13214	11176	6738	3137
Lajes Field, Azores	13244	11271	8967	6750	4746	3081
Loring AFB, Maine	13214	11179	8964	6738	3074	
MacDill AFB, Florida	18019	13244	11246	8993	6750	4746
McClellan AFB, Calif.	18002	13201	11239	8989	6738	3067
Thule AB, Greenland	13201	8967	6738			
Yokota AB, Japan	18002	13201	11236	8967	6738	4747

National Broadcasting Center. Another report stated that the station would be called "Israel Radio" for the duration of the Gulf war.

My recent monitoring of the station shows that they are still using the Kol Israel ID on shortwave but at sign off, they mention the merger. It apparently affects their combined Hebrew network on AM and FM, then they pass along all the frequencies they are transmitting on.

Furthermore, all transcription programming produced in Israel has been suspended and the features, Israel Magazine and Israel Press Review, are now being produced in New York City studios for distribution to American studios.

To help you follow what broadcasters in the region are saying, a complete list of shortwave broadcasts from the region has been made available by Phillip Yant on the International Fidonet shortwave echo. That list is presented in Table One.

As always, the British Broadcasting Corporation (BBC) has been rock solid in its coverage of the Gulf war. One shortwave listener, Tad Cook, says, "...the BBC has had the best coverage on SW of the Gulf crisis. I listen to it every night. I have become an incurable news junkie."

Extended news and analysis has been noted on the BBC. A complete list of frequencies can be found in our monthly "Shortwave Guide" included in every issue of MT.

Brian Johnson reported that National Public Radio was the source the BBC World Service used to carry a speech by President Bush. This was the speech the President made announcing the war on the first night of the

conflict.

"BBC went live with the speech." Brian said. "It sounded funny watching local television and hearing it on shortwave also. In fact, there were a lot of feeds re-broadcast over BBC SW lately concerning the war in the Gulf."

For the newcomer to the hobby, I recommend sticking with shortwave broadcast to monitor the current Gulf situation. Shortwave broadcast offers the newcomer a chance to hear the news directly from the affected countries.

Maybe you will be able to hear first-hand some of the headlines like those below that have been heard since the start of the war:

**RADIO KABUL REPORTS
PRO-IRAQI VERSION OF WAR**

BAGHDAD RADIO CALLS ON MOSLEMS
WORLDWIDE TO "STRIKE U.S. INTERESTS"

SAUDIS DENY RADIO BAGHDAD REPORT OF
PRESENCE OF ISRAELI AIRCRAFT

BAGHDAD RADIO SAYS IRAQ HAS DOWNED
94 ENEMY AIRCRAFT SINCE WAR BEGAN

AIR RAID SIREN SOUNDS IN TEL AVIV SECOND
TIME BUT RADIO SAYS IT'S FALSE ALARM

**Action as it Happens:
Utility Band Monitoring**

If you are a seasoned veteran or experienced utility monitor, the best action will be found on the utility bands. As mentioned earlier, the first indication that I had that the war had started was heard in the utility bands.

For the newcomer, the Utility Bands are

those frequencies that lie between the shortwave broadcast, amateur radio, and citizen band frequencies. Anything not normally intended for general public broadcast are considered utility frequencies.

The first thing you must remember is that utility stations do not have schedules like shortwave broadcast stations. These frequencies are catch as catch can.

Another factor which will play heavily on your monitoring effort will be propagation into the Middle East. Take a look at the propagation charts in this issue of MT. There are charts developed for the East and West Coast as well as the Central section of the United States. There will be times that propagation will not permit reception of the Middle East or reception on the frequency you are trying to hear activity on. Use our prop charts as a guide in planning your monitoring efforts.

Next, you need to determine what frequencies you think activity will occur on. The best starting point to monitor US Air Force activity will be on the Global Command and Control Network or GCCS. Table Two list the frequencies in this network.

This radio network is used by all branches of the service, and especially MAC aircraft enroute and from Saudi Arabia. The callsigns used by these aircraft consist of MAC ##. Best times to hear Croughton, Lajes and Incirlik is from about mid afternoon through early evening.

Most utility monitors I have talked to, verified by my observations as well, indicate that 6738 and 11176 kHz have been very active during the conflict. 6738 and 11176 are part of the USAF GCCS (Global Command and Control System). You can expect to hear a lot of traffic on these frequencies (i.e. MAC flights [transports] going to/from the Persian Gulf region). Don't expect to hear "shoot 'em up traffic" (bombers & fighters in action) here, however.

Here's some of the interesting traffic that has been monitored on these frequencies.

One the first night of the war, I caught this all US Air Force GCCS warning: *"In Riyadh for commercial aircraft only, a SCUD missile alert is in effect."* To say the least, that transmission got my immediate attention.

Another interesting message heard since the start of Operation Desert Storm has been a message directed to MAC stations and CRAF flights broadcast repeatedly on several HF military channels by Lajes, MacDill, Ascension and others. The hourly (at Hr+15) announcement reads:

"Attention MAC stations and CRAF

Aeronautical (OR) Shortwave Allocations Table Three

(OR = Off-Route = Non-Civilian = Military)
All frequencies in kHz

3025 - 3400	
3500 - 3950	Regions 1+3 only
3750 - 4000	Region 2 only
4438 - 4650	Regions 1+2 only
4700 - 4750	
4750 - 4850	Regions 1+2 only
5450 - 5480	Regions 1+3 only
5680 - 5730	
5730 - 5950	Regions 2+3 only
6685 - 6765	
8965 - 9040	
10150 - 11175	Secondary allocation (to other radio services)
11175 - 11275	
13200 - 13260	
13410 - 13600	Secondary allocation
13800 - 14000	Secondary allocation
14350 - 14990	Secondary allocation
15010 - 15100	
17970 - 18030	
20010 - 21000	Secondary allocation
23000 - 23200	Secondary allocation
23200 - 23350	
27500 - 28000	
29700 - 30005	

Regarding the Regional allocations above, the world is divided into 3 regions for the purposes of frequency assignment.

Region 1: Includes Europe, Africa, Soviet Union and much of the MIDDLE EAST. See NOTE below.

Region 2: Includes North, Central and South America.

Region 3: Includes Iran, Pakistan, India, China, Japan, Indonesia, Australia and the Southern Pacific and Indian Oceans between 60 degrees East and 120 degrees West.

NOTE: Most DESERT STORM operations are in Region 1 but some straddle a portion of the border between Regions 1 & 3. That line runs in a great circle arc from the intersection of 40 degrees North, 40 degrees East to the intersection of 60 degrees East, 24 degrees North (the Tropic of Cancer). If you plot this on a map of the Middle East you'll see that this line runs up the middle of the Persian Gulf, through eastern Iraq and north into Turkey.

aircraft. All missions are cleared to their AOR destinations. Confirm destinations with MAC Command and Control prior to takeoff and AOR entry."

Several monitors have wondered what the CRAF and AOR acronyms mean. CRAF is the Civil Reserve Air Fleet ... all those United and Continental and Delta aircraft ferrying troops to the Persian Gulf. The government

and US airlines have an agreement whereby the airlines provide planes for government service (the CRAF) during emergencies. President Bush signed an order putting 180+ civilian airliners in government service ... in this case to move troops and supplies to the Middle East.

In aviation, Off-Route (OR) means non-civilian, or military. So it is believed AOR

AMIGA + ICOM R7000

The Ultimate Scanning Combination. !!!

Finally the power of the Amiga can control the ICOM R7000.

- The ONLY scanner control system that directly generates speech.
- The Amiga can say the frequency, time and even the users comment!
- The Amiga directly controls the tape recorder.

Imagine the possibilities, after an automated logging session the tape may be played back with hit activity (no dead time) and accompanying time and/or frequency information. All hit activity will be shown in high resolution graphics and may be saved to disk. Each individual channel (up to 1024 per file) may control.....

1. Lockout (skip)
2. Mode (AM / FM / FMN / SSB)
3. Say the frequency.
4. Say the time.
5. Say the users comment. (Up to 80 characters per channel)
6. Start / stop the tape recorder.

Scans over 1300 channels per minute on any Amiga. Global controls can also enable/disable the speech and record functions. User or auto scaled high resolution graph displays current activity and log. Extremely powerful scan delays. May scan by comment. Does NOT require Icoms speech board. Fully mouse driven, menus, icons, built in editor etc. Autoscan generates scan files with date and time log. ASCII file format. Fully multitasking. Many, many more features.....

Includes hardware interface, software, manual.

\$149 (check or money order)
Future Scanning Systems.
406 N. Delaware
Dewey OK 74029
918-534-3210
demo and manual \$15 (refundable)

World Probe
\$29.95
+ \$3 P & H
World Band / Scanner Antenna
• Cuts Noise • Improves Reception • Indoors or Out •
• Works with all World Band Portables and Scanners •
• Sleek 6-ft Probe with Integral 25-ft Low-Loss Shielded Feedline •
• Fully Insulated and Weather Sealed • Decorator White Design •
AntennasWest Box 50062-M FREE Storage Pouch
801 373 8425 Provo, UT 84605 & Universal Connector Kit

Taking a Ham Test?

Study for all exams at your PC.

NOVICE THROUGH EXTRA CLASS
BOTH WRITTEN AND MORSE CODE

All 5 Classes
One low price!
Only \$39.95
postpaid on five
5 1/4" 360K disks.



Pass the Theory License Ham Exams

IBM compatible software contains all 1,931 actual questions, multiple choices and answers appearing in the written tests of every VEC. Review questions by license class or subelement. Print out actual tests or practice taking written examinations right at your computer keyboard ... from the beginning Novice to the top-of-the-line Extra Class. (4 Disks) BONUS! 200-page Radio Amateurs Licensing Handbook ... plus the current Part 97 FCC Ham Rules & Regulations!

Having Trouble with the Code?

Morse Academy software actually teaches all 43 required code characters and then steps you up through the Extra Class 20 WPM level using sophisticated computer aided instruction techniques. Adjustable tone, standard or Farnsworth spacing. Sends text or random generated characters ... even properly constructed code exams. Many features ... even a 40-page on-disk manual! (1 Disk)

Guaranteed to do the job!

Fast service ... Shipped within 24 hours!

The W5YI Group

P.O. Box 565101, Dallas, TX 75356

CALL TOLL FREE

1-800-669-W5YI (9594)



Photo by Steve Douglass

The British RAF (Royal Air Force) can be heard operating in the Gulf on 9.011 MHz USB.

stands for Assigned Off-Route. In effect, the announcement is clearing these civilian planes (using MAC callsigns) to their assigned military destinations after they confirm same with MAC Command & Control prior to departure and again just prior to entering their military area.

The procedure serves two purposes: first, it helps control and monitor a/c flying into a military zone, and secondly, it can be used to warn CRAF flights of danger (missile alerts, etc).

Monitors have heard most of the USAF GCCS stations making this announcement on many GCCS freqs. Listen closely on a particular freq and you may hear many stations making the same announcement over a 1-2 minute period.

A lot of interest has been generated since the start of the invasion about following the MAC flights. Roger Pettengill offers the following suggestions to aid you in learning aircraft destinations.

As you follow the MAC flights to/from the Middle East on 11.176, 13.214 MHz, etc., you may hear a type of code in the pilot's conversations with ground stations.

Example: "We are estimating arrival at Lima Echo Zulu Alpha [LEZA] at time 0330." Or "Request weather for Echo Delta Alpha Foxtrot at 2100."

Those 4-letter codes are non-classified, internationally recognized location identifiers established by ICAO (International Civil Aviation Organization) for use by the world's meteorological and aviation organizations to

identify airports and weather facilities (both civilian and military) throughout the world.

In lieu of the complete world ICAO list (which has over 10,000 entries) here are identifiers for points you may hear mentioned on the above freqs:

EDAF Frankfurt Rhein-Main, GERMANY
EDAR Ramstein AB, GERMANY
LETO Torrejon AB, SPAIN
LEZA Zaragoza AB, SPAIN
HECA Cairo Int'l, EGYPT
HECW Cairo West, EGYPT
FJDG Diego Garcia, INDIAN OCEAN
LLBG Ben Gurion Airport, Tel Aviv, ISRAEL
LTAG Incirlik AB, TURKEY
OBBI Bahrain Int'l, BAHRAIN
OEDR Dhahran Int'l, SAUDI ARABIA
OEJB Jubail, SAUDI ARABIA
OERK Riyadh Int'l, SAUDI ARABIA
OETF Taif, SAUDI ARABIA
OEJN King Aziz Int'l, Riyadh, SA
OMSJ Sharjah Int'l, OMAN

And oh yes,

ORBB is Baghdad Int'l Airport, IRAQ

Format for decoding ICAO identifiers:

ICAO Region
Country
City
Airport

O E R K = International Airport, Riyadh, Saudi Arabia

The following is an index of region/country identifiers for the principal nations in and around the Middle East (whether or not currently involved with US military activities) as well as nations that may support activities for flights to/from the Middle East (stopover points, diversion airports, etc).

ED	Germany	OE	Saudi Arabia
EG	England	OI	Iran
FJ	Diego Garcia	OJ	Jordan
HE	Egypt	OK	Kuwait
K	USA	OL	Lebanon
	(lower 48 states)	OM	United Arab Emirates
LC	Cyprus	OO	Oman
LE	Spain	OR	Iraq
LL	Israel	OS	Syria
LT	Turkey	OT	Qatar
OB	Bahrain	OY	Yemen
OD	Yemen		
	(Dem. Rep.)		

Now if you hear a location indicator beginning with "LE," you'll know the place referred to is in Spain.

Over the years I have tried to stress to newcomer and old timer alike that tuning through the spectrum is the best way to find activity and make new discoveries. Roger Pettengill has compiled Table Three to give you some idea of where you ought to be tuning for possible Desert Storm activity.

One key point I want you all to remember is that not everything you will hear on the military freqs these days is related to Operation Desert Storm. I think we are all so anxious to hear some "war action" from the Persian Gulf that we are too quick to claim anything unfamiliar we hear as being from Operation Desert Storm.

Probably much of the HF traffic these days is related to Operation Desert Storm if even only in a remote sense. But the fact remains that much of it is pretty routine stuff that has been going on for years.

As one ute veteran put it, "We must keep our minds and our ears open as we tune the bands. Take notes as you listen. Better yet, tape what you hear ... you'd be surprised what you miss the first time because you're hearing what you want to hear, not what is being said."

For those interested in hearing the war via normal HF ATC (Air Traffic Control) channels, it has been pretty much a bust. Since the air space is being so tightly controlled, not much has been heard on these frequencies. About the only frequency even remotely productive has been my favorite 11300 in the AFI-3 family of frequencies. This is an ACC frequency for Sanaa, Saudi.

Radio C. Crane Co.

1-800-522-TUNE(8863)

Watson Lane, Fortuna, CA 95540



With all the increased tension recently, this might be a good time to monitor the Department of Energy's Nuclear Transport Safeguard Network. Tad Cook says they use USB on these frequencies:

3.335 MHz
5.751 MHz
7.700 MHz
11.555 MHz

They also use data transmissions on these frequencies.

Another set of frequencies to watch belong to the International Committee of Red Cross. Now that prisoners of war have been taken ICRC frequencies should get interesting to monitor. Keep a watch on the following frequencies:

3800 3814 6997 13568 13915 13950 13965
13973 13997 14375 20753 20800 20815 20942
20998 27998

Expect to hear either CW or USB transmissions on these frequencies from Geneva, Switzerland, and portables in the field.

You should also expect to hear activity concerning the war from unexpected sources. Pete Kemp monitored the following messages during a broadcast from U.S. Navy COMSTA (Communication Station) NAM in Portsmouth, VA:

SPECIAL WARNING NUMBER 83.
PERSIAN GULF - GULF OF OMAN

1. MARINERS ARE ADVISED TO EXERCISE EXTREME CAUTION AND TO MAINTAIN ALERT VISUAL WATCH TO HAZARDOUS CONDITIONS WHEN TRANSMITTING THE WATERS OF THE ARABIAN (PERSIAN) GULF DUE TO RECENT SIGHTINGS OF FREE-FLOATING, ARMED CONTACT MINES.

2. ANY SIGHTING OF A FLOATING MINE SHOULD BE REPORTED TO COMMANDER MIDDLE EAST FORCE ON VHF CHANNEL 13 OR CHANNEL 1B. NOTE POSITION, SET AND DRIFT, AND GENERAL APPEARANCE. ADDITIONALLY, WATCH ALL WATERCRAFT FOR SUSPICIOUS ACTIVITY. BT CQ CQ DE NMN/NAM/NRK/NAR/GXH/AOK AS SP AR

(Unclassified Transmission, monitored 8.090 MHz, CW)

SPECIAL WARNING NUMBER 84.

PERSIAN GULF - ARABIAN SEA - RED SEA
1. UNITED NATIONS SECURITY COUNCIL RESOLUTION 678 (1990), ADOPTED 29 NOVEMBER 1990, AUTHORIZED MEMBER STATES CO-OPERATING WITH THE GOVERNMENT OF KUWAIT, UNLESS IRAQ ON OR BEFORE 15 JANUARY 1991 FULLY COMPLIES WITH RESOLUTION 660 (1990) AND ALL SUBSEQUENT RELEVANT RESOLUTIONS, TO USE ALL NECESSARY MEANS TO UPHOLD AND IMPLEMENT SUCH RESOLUTIONS AND TO RESTORE INTERNATIONAL PEACE AND SECURITY IN THE AREA.

SELECT-A-TENNA - Doubles the normal listening range of any AM(BCB) station!
AUTO ANTENNA - Easily installed, almost doubles AM reception, no FM degrade.
SANGEAN - We've carried a wide range of Sangean products for years!
GRUNDIG Satellit 500 - The best portable at \$549.00.
McKAY DYMEK - World's best active SW antenna, US made - \$199.00.
BARKER WILLIAMSON - The best trapped dipole for the shortest length at 35'
PROTON - The finest clock radio and compact stereo units, better than Bose.
UNIDEN SCANNERS - Decent price plus custom modifications.
AMPLIFIED SPEAKERS - Transforms any earphone jack to high quality sound.
CHANNEL MASTER FM ANTENNA - Most powerful FM antenna 12'6"L X 6"W.

- Please write for full products list and ask for more detailed information on any item of interest. Our prices are among the lowest in the nation.
- All prices include shipping and handling - 30 day satisfaction all products
- Information, experience, and service to help you decide which are best.

2. ALL MERCHANT SHIPS ARE ADVISED THAT, SHOULD IRAQ FAIL TO COMPLY FULLY WITH RESOLUTION 678, THEN, AFTER 0500(GMT) 16 JANUARY 1991, ARMED FORCE MAY BE USED IN THE WATERS BORDERING THE NATIONS OF IRAQ AND KUWAIT AND THE ARABIAN PENINSULA, INCLUDING THE PERSIAN GULF, NORTH ARABIAN SEA, AND RED SEA.

3. ALL PROCEDURES OF THE MULTINATIONAL INTERCEPTION FORCE, DESCRIBED IN SPECIAL WARNING NO. 80 REMAIN IN EFFECT.

4. FAILURE OF A SHIP TO PROCEED AS DIRECTED BY THE INTERCEPTING SHIP WILL RESULT IN THE USE OF THE MINIMUM LEVEL FORCE NECESSARY TO ENSURE COMPLIANCE.

5. ALL SHIPS, INCLUDING WATERBORNE CRAFT AND ARMED MERCHANT SHIPS OR AIRCRAFT, WHICH THREATEN OR INTERFERE WITH THE MULTINATIONAL INTERCEPTION FORCE WILL BE CONSIDERED HOSTILE AND COULD BE FIRED UPON. BT BT THIS TRANSMISSION IS A REBROADCAST OF SPECIAL WARNING 84 DTG 121300Z JAN 91

(Unclassified Transmission, Monitored 8.090 MHz, CW)

Numbers buffs have also reported increased activity since the start of the war. Phonetic stations are all over the spectrum, and some increase has been noted since the events of last week in the Gulf. These stations are normally associated with the Israeli Mossad Intelligence community.

Tim Tyler has reported to CompuServe that there has been a large increase in the so-called numbers broadcasts aimed at spies, especially in the 7 MHz band. Tim also says some of these are attributed to Israel's Mossad intelligence agency and they have been more active on 9251 kHz.

Satellites are the best bet!

One of the best bets to monitor American military communications in the Gulf is from the FLEETSATCOM satellite network between 240 and 270 MHz. Most of the voice traffic is in the 260 MHz range, and most is

SHORTWAVE NAVIGATOR

The \$69 Macintosh program that gives you more than just frequencies. Navigator offers graphics and sound, program information (including DX/Media programs), reports, searching and sorting, logging, buttons and macros, and simplicity of use. WRTH Most Innovative Software 1988. Now, with HyperCard 2.0, enjoy multiple windows, etc. If you use any Kenwood TS Series equipment or the R-5000, get the computer control version for \$99 (includes Copilot/Autopilot).

Copilot

A Macintosh-only computer control program which displays 3 frequencies simultaneously — both VFOs and the memory channel. Imports/exports from your own databases. Buttons permit easy scanning (forward and reverse). The sweep function will sweep thru preset bands in both the BC and Ham bands (user-definable limits). Smart enough to tell what Kenwood it is hooked up to and adjusts features accordingly. With Autopilot \$69 — with SW Navigator \$99.

Autopilot

Autopilot operates just like a VCR, switching between different frequencies and modes at preset times. When used with the Kenwood R-5000 it allows multiple timed recordings of broadcasts, turning the receiver on and off. When used with TS Series of Kenwoods, it can program your listening schedule. It functions in the background, thus freeing your Macintosh for other tasks while the timer continues to operate. With Copilot \$69 — with SW Navigator \$99.

Prepaid mail orders in US funds only. Not available in retail stores. Write for details!

DX Computing

232 Squaw Creek Rd.
Willow Park, TX 76087
(817) 441-9188

When requesting help from MT columnists, be sure to enclose an SASE (self-addressed, stamped envelope) for their reply.

coded. But in wartime conditions some uncoded messages may go through.

If you are equipped to listen to FLEETSATCOM activity, check for transmissions from the Atlantic 23 degrees west bird. The DOD wideband channel from 260.475 - 260.975 MHz has been particularly active with 260.600 a definite channel to watch. I would appreciate receiving any additional reports from those of you hearing any activity on this satellite.

Monitor Russell Wright says, "I have monitored some very interesting activity from 261 - 264 MHz FM using a PRO-2004 and customized Yagi."

Those of you equipped with scanners can also hear activity. This just happens to be the skip season on the VHF-low band from 30 - 50 MHz. A lot of reports indicate a bunch of activity from Desert Storm in this frequency range. Best time to check for skip signals from the Middle East is from 6 AM to Noon your local time.

I have caught activity on 32.250, 32.350, 32.450, 32.550 and 33.300 concerning air to air transmissions from the Gulf via Dragon Ops. Air Traffic Control frequencies include: 32.200, 32.300 and 32.400 MHz. In the "for what it is worth" department (probably bombed out of existence by now), Iraqi air defense comms have been noted on 42.800 MHz repeater output and 42.300 MHz repeater input.

Other frequencies to watch include:

30.650 30.700 32.100 34.100 34.150 34.500
(Command and Operations); also 37.050
33.150 33.000 33.850 34.200 34.700 36.500

TVRO folks get in on the action

As you might well imagine, TVRO enthusiasts have been catching a lot of activity from news agencies over in the Middle East. Tandy Way filed one of the initial reports and says that activity was seen on satellite Galaxy 6 transponders 1 and 3. John Kerr reported activity on the same bird from transponders 5 and 20. Bob Seaborn also reported activity on Galaxy 6 transponder 2.

Some of the activity by reporters has been a little bizarre. Frank Kennedy reported that he and his wife enjoyed the cutting up by reporters on Galaxy 6. One imitated Elvis and left while the other said, "Elvis has left the building." Just before that, one had made it sound off camera like he was inhaling laughing gas! I thought, "My god, they are getting loaded over there or something...." But it's a reaction to the stress, actually.

Tom Taylor says he has seen quite a bit more activity on the Intelsat VI F4 bird located at 27.5 degrees. All of my transponder numbers are going to be approximate as I have adjusted frequencies to correspond to the Intelsat bird. He says that Transponder 5 is raw feeds to CNN. NBC Tel Aviv is on 6 and I have tuned in Bright Star London on 10. I also noticed VISNEWS on a lower transponder running raw feeds of the war. Brightstar is at 3.885 GHz, NBC London is at 3.917 and ABC is at 3.975. An interesting thing about the ABC feed is that they run an audio subcarrier at 5.78 MHz for Capital Radio, "London's number 1 rock and roll radio station," with local advertisements and all.

He has also recently noticed a weak CNN feed on a lower bird, probably Intelsat V-F6 on about transponder 23. CNN also uses the two Russian birds Gorizont 12 and 15 at 11 and 14 degrees west which are just viewable at his Cincinnati location. In fact, this is probably where Saddam Hussein watches CNN! That particular satellite is quite popular on Middle East backyard dishes.

One of the more interesting aspects to the coverage from the Gulf has been concerning CNN's use of a "four wire" system. Also many have asked me how Peter Arnett can still report from Baghdad with the telecommunication center out of commission.

First of all, to stay on the air, they have a portable generator to power their equipment. That is how they managed to charge the batteries in their equipment while the rest of the hotel they were staying in was blacked out.

The other networks did have correspondents in Baghdad during the first night of the war, but they got knocked off the air when the city phone system died about 30 minutes after the bombing started.

The reason CNN scooped the other networks is that the CNN crew had brought a "four wire" into Iraq with them to use as a backup in case the phone system went out. They were the only network with a "four wire," enabling them to stay on the air. The other networks asked to use the "four wire" but Bernard Shaw refused to let them use it (competition being what it is in the news biz).

John Ross gives us the inside scoop on CNN's "four wire" system. A "four-wire" is a telephone circuit that does not use the same pair of wires for message transmission in both directions. Instead, outgoing messages travel in one direction on two of the wires, and incoming messages travel in the other direction on the other two wires.

Based on an account in a trade paper, it's

my understanding that CNN had bought a four-wire circuit from their bureau direct to the Baghdad international telephone exchange from the local telephone authority, and connected it to a private ATT circuit back to the USA. They also had their own small satellite transmitter, but the first night's coverage used the telephone lines.

Part of the reason they were able to stay on the air was that they were bypassing the local telephone exchange, and using a dedicated private line. The four-wire part provided improved audio, and made it possible to move voice in both directions at the same time.

In data terms, a four-wire line is full duplex, and a two-wire line is half duplex.

CNN has stayed on the air, (Peter Arnett, that is) courtesy of an INMARISAT telephone link. The INMARISAT satellites normally relay telephone conversations to and from ships. It was designed to take the place of the ship to shore HF channels most ute fans are familiar with. These satellites operate in the 1.5 GHz frequency range, hence the smaller size dish antenna folks have seen on CNN. They now almost exclusively show Arnett outside the hotel talking into a telephone which is being fed through the transmitter to the small dish in front of him.

ABC was the first to go on the air live from Baghdad when the fireworks started, but CNN's triumph was in being able to stay on the air so long.

One final note to our coverage is the publicity that the hobby has received courtesy of the war. Shortwave listeners, ham radio operators and utility band buffs have been seen on television, been interviewed by radio stations, and have graced numerous magazines and newspapers articles. Publicity for the hobby has been tremendous with benefits that will last for years to come.

Our own MT family and staff have done numerous interviews all over the country, and yes it is true, even the now world famous CNN called MT for frequency information.

As you can see, there are a lot of targets to listen for, no matter what your interest or equipment capability. Be sure to report the results of your monitoring to your favorite editor or you can send the information to me. Be sure to mark your envelope "Operation Desert Storm: Larry Van Horn." If the war continues, and we all hope it doesn't, I will update this story as information permits.

Now it is time to slip into the radio room, fire off the rig and check out "The War in the Middle East."

mt



The ICOM EXPERTS

Minutes From
Washington, D.C.

CLASSIC



R71A .1-30 MHz

- World Class HF Receiver
- All Mode AM, CW, SSB, RTTY, FM (Opt)
- Keyboard And Memory Frequency Entry
- 32 Programmable Memory Channels
- Optional Filters, Voice, 12VDC, Computer Input
- Many EEB Options Listed In Our 1990 Catalog
- 117/220/234 VAC 13.8 VDC (Opt)
- 11.25W x 4.44 x 10.9D (Inch) 16.5 Lbs

List \$999

EEB Discount Price \$849.95 + UPS

Get The Details From
Our FREE 1991 Catalog.

CLASSIC



R7000 25-2000 MHz

- VHF/UHF Classic Nothing Like It Under \$4000
- Triple Conversion Eliminates Images
- Tuning Steps .1, 1.5, 10, 12.5, 25 MHz Increments
- 99 Programmable Memory Channels
- Sensitivity Better Than .5µV (12dB SINAD) FMN
- Multimode AM, FM, FMN, FMW, CW/SSB
- Many EEB Options Listed In Our 1990 Catalog
- 117/220/234VAC 13.8VDC (Opt)
- 11.25W x 4.4H x 10.9D (Inch) 17.5 Lbs

List \$1199.00

EEB Discount Price 1019.00 + UPS

CLASSIC



R9000 .1-2000 MHz

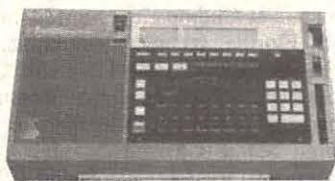
- Never Has So Much Been Offered In One Receiver
- Covers Everything VLF (100 kHz) To Super UHF 2 GHz
- Multimode AM, FM, FMN, FMW, CW, SSB, RTTY
- 1000 Programmable Memory Channels
- DDS (Direct Digital Synthesizer) Tuning
- CRT, Spectrum Analyzer, Multi Screen Readout
- Power 100-120VAC 220-240 12VDC (Opt)
- EEB Optional Power Supply And Filters
- 16.7W x 5.9H x 14.4D (Inch) 44.1 Lbs

List \$5495.00

Call
EEB Discount Price ~~\$4795.00~~ + UPS

FREE DETAIL LITERATURE ON ALL ICOM PRODUCTS
CALL 1-800-999-9877

CLASSIC



ICF2010 RECOGNIZED BY THE EXPERTS AS THE WORLDS BEST PORTABLE RECEIVER, "IT EVEN RIVALS SOME TABLE MODELS".

- AM/CW/LSB/USB .15-30MHz
- FM Wide 76-108MHz
- Air Band AM 116-136MHz
- 32 Memories-Keyboard Entry
- Synchronous Detection
- Separate Multi Function Clock
- 6.2 x 11.4 x 2 Inches 3.8 Pounds
- Power AC120V Adaptor Incl. Option 12VDC DCC127A 3 "D" Cell, 2 "AA" Not Included
- Free EEB RS-1 Radio Stand With Order

List \$429.95 EEB \$349.95 + \$6 UPS

CATALOG



CATALOG

- Full Line SWL Receivers
- Many SWL Antennas
- Scanners & Accessories
- Books, Books & More Books
- Converters, Filters
- Clocks, Speakers & More
- Ask To Be Put On Our Mailing List For Future Publications

FREE Call Or Mail In
For Your FREE Copy

NEW



SONY ICF SW 7600

- SW All Bands .1-30 MHz
- FM Stereo With Headphones (Incl)
- 10 Memories & Clock Timer Alarm
- CW SSB (USB, LSB) AM FM
- Keyboard Frequency Entry
- Complete System Including Ext Ant, Headset, Book, AC Adapter
- New Replacement For ICF-2003
- Free EEB RS-1 Radio Stand With Order

List \$259.95 EEB \$219.95 + UPS

EEB ELECTRONIC EQUIPMENT BANK
323 MILL STREET, N.E.
VIENNA, VA 22180

ORDERS: 800-368-3270
LOCAL TECH: 703-938-3350
FAX: 703-938-6911

- PRICES SUBJECT TO CHANGE
- PRICES DO NOT INCLUDE FREIGHT
- SORRY, NO CODs
- RETURNS SUBJECT TO 15% RESTOCK FEE

DRUG WAR Monitoring

by William Shelby

This month we conclude our two-part special feature on monitoring the drug war as we see how military and other federal agencies are used; we also present the most exhaustive list of federal drug interdiction frequencies and call signs ever published.

Military Support

The military has found anti-drug operations to be excellent training. Their E-2C Hawkeyes provide airborne radar surveillance, the P-3 Orions long-range anti-ship patrol, and the S-3 Viking anti-submarine warfare aircraft shorter range sea surveillance.

When working Customs, Navy aircraft identify with a word, often combined with numbers and, like the Coast Guard, will

employ a different call sign when working their own communications stations (commstas).

The US Marine Corps participates with its OV-10D Bronco observation aircraft. These have been fitted with FLIR and work with Customs in the SE states.

The US Air Force allows Customs officers to man a radar console aboard its E-3 Sentry AWACS aircraft whenever they are on a training exercise. Although configured for aircraft detection, the radar is surprisingly effective against ships and ground targets. One AWACS tracked a vehicle from the scene of a drug drop right into the suspect's garage!

CUSTOMS FREQUENCIES

The following frequencies and accompanying phonetic designators have been employed by the US Customs Service. Currently the Xray freq series does not appear to be in use. All frequencies are USB.

XA-2808.5	ZD-12222
VK-3369	YE-13312
YA-3428	TB-13907
ZA-4500	??-14493.5
XB-4991	ZE-15867
XC-5058.5	XG-15953.5
YB-5571	VD-15964
ZB-7527	XH-17601
XD-7778.5	YF-17972
YC-8912	VC-18594
XE-9238.5	XI-19131
ZC-9802	VB-20631
TA-10242	TC-20890
XF-11073.5	TD-23214
YD-11288	TE-25350
VF-11494	VA-27870

CUSTOMS SELSCAN

This has been referred to as the Admin Net or Conference Line, and consists of channels 1 through 10: 7527, 8912, 10242, 11494, 13907, 15867, 18594, 20890, 23214 and 25350 kHz.

There are no solid indications that freqs below 7527 or above 25350 kHz are currently part of the auto Selscan network. From a logical point of view there should be at least one or two freqs below 7527 and one above 25350 kHz for full HF coverage. Unfortunately, 7527 has been IDed on three occasions as Channel 1.

OTHER POSSIBLE FREQUENCIES

Currently there has been a noticeable decrease in both day and night Customs traffic, suggesting that frequencies yet to be identified are now being employed, possibly from the list below. These include lesser used SAC, USCG, Justice and Rockwell Collins assignments.

3265	7475	12287.5
4048.5	7530	13205
4495	7657	13547
4850	7983	13658.5
5026	8083.5	14358
5243	8101	14716
5313	9017	14744
5422.5	9073	14955
5684	9125.6	15044
5745	9220	15544
5765	9234	15548.6
5912	9278.5	16375
5987	10136.6	18005
6680	10153	18046
6712	11100	18196.1
6757	11118	18721.1
6826	11408	20348.5
6840	11434.6	20737
6870	11513.5	21815
6914	11607	23419
7330	12150	25378

The following is a list of additional aeronautical USB voice mode HF freqs assigned for use by Rockwell-Collins.

2851	13658.5
5251	16376
5277	20348.5
5912	21931
12138.5	23403.5
	23675

Aerostats

Within a short time, the US Customs Service will have all of its aerostats in operation. All are operated and maintained by a civilian contractor. They are located at Yuma, Arizona; Fort Huachuca, Arizona; Deming, New Mexico; Marfa, Texas; Eagle Pass, Texas; Rio Grande City, Texas; Matagorda, Texas; Morgan City, Louisiana; Alabama Port, Alabama; Horseshow Beach, Florida; and Puerto Rico. Two Air Force aerostats at Cudjoe Key, Florida, and Patrick AFB, Florida, complete the chain.

In the Bahamas the US Coast Guard has one at High Rock on Grand Bahama Island (Cariball 1), one near Georgetown on Great Exuma Island (Cariball 2) and a third to be located on Great Inagua Island (Cariball 3). Long range ground-based radars are at various Caribbean locations including Guantanamo Bay, Cuba; the Dominican Republic; Providenciales, Caicos Islands; Jamaica; Honduras; Panama and other sites.

New aerostat range has increased to about 200 miles and they can stay aloft for 30 days without refueling the generators. It would take 25 USAF Sentry AWACS flying 24 hours per day to provide the same coverage. At over \$20 million each, the aerostats are a good investment.

Basically a blimp 230 feet long and 70 feet in diameter, the aerostat carries a ton and a half of electronics in a pod under its belly. It can be raised to an altitude of nearly 15,000 feet via a steel mooring cable anchored to a ground support. Radar data are sent by secure means to the appropriate C3I center.

The aerostats do have a weak link: bad weather. Cudjoe Key lost two within a year;

one had its mooring line severed by a lightning strike and, as it drifted towards Cuba, was shot down by USAF fighters. Its replacement crashed to earth due to extensive thunderstorm damage. While being lowered due to a high wind alert, the Customs aerostat at Fort Huachuca, Arizona, was hit by a dust devil which tore it apart. And the Customs unit at Marfa, Texas, parted its mooring line during severe weather and eventually made a heavy landing. Some have been damaged by lightning poking holes in the balloon envelope, while others have been temporarily knocked out due to electronic glitches in the on-board electronics.

Even though the aerostat chain is far from perfect, it has had a dramatic impact on the airborne cocaine express service, resulting in fewer flights and more apprehensions. Now smugglers are forced to risk nap-of-the-earth flying, otherwise Customs will detect them over 100 miles from the border.

Sea Radar

Out at sea the USCG deploys a shipboard mobile mini aerostat system (TARS) aboard five civilian contracted vessels. It can be raised to 2,500 feet and has a radar horizon of about 50 to 60 miles. These mobile units often operate in the Yucatan Channel, the Gulf of Mexico and various Caribbean choke points. They sometimes can be heard in voice contact

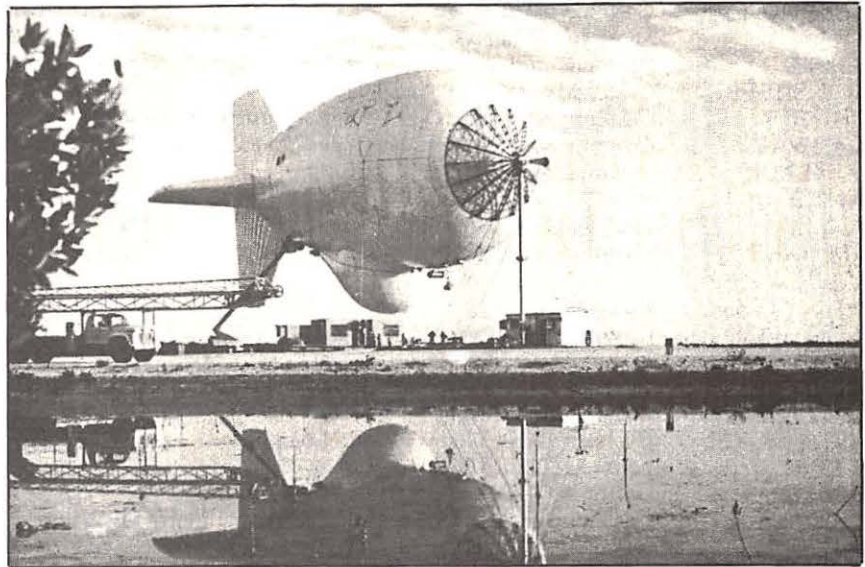
with Coast Guard Commstas.

Land Radar

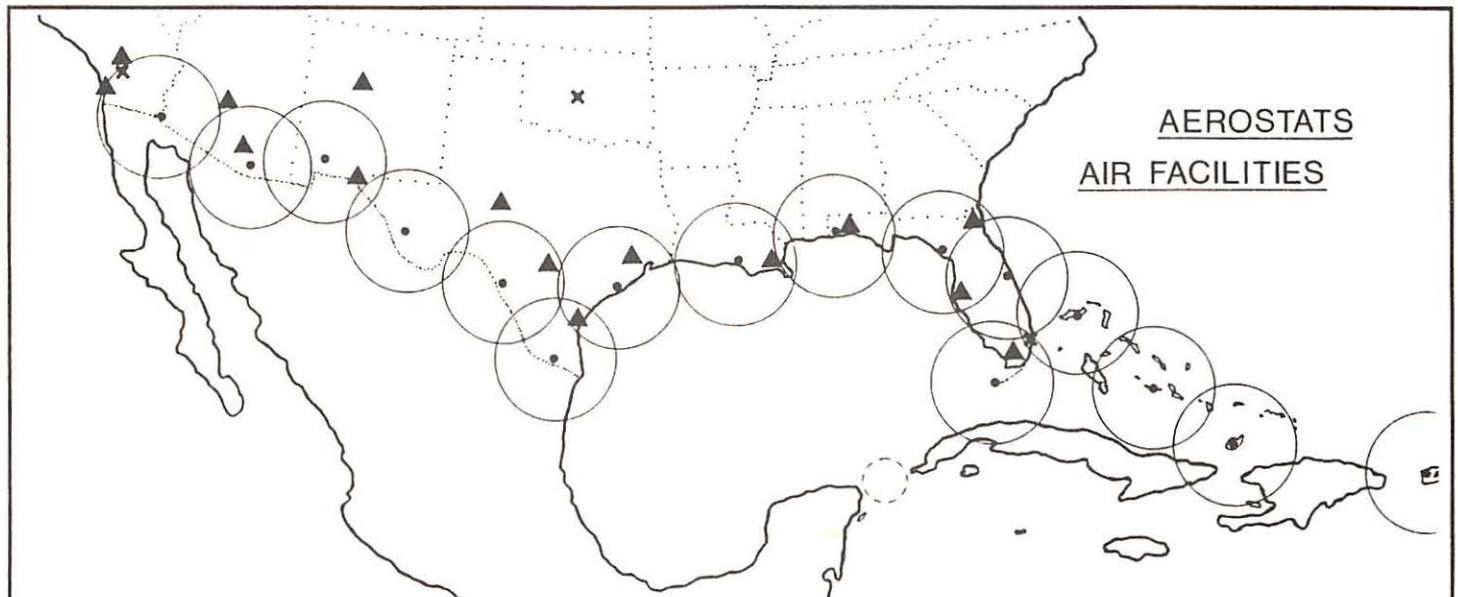
Several tactical USAF mobile radar units in the Bahamas with call signs like "Boat Sail", "Gangster", "Coffee Table", "Alley Cat", "Chastise", "Free Mason", "Pyramid" and

"Coffin Corner" are being phased out by the Bahamas aerostats. Their net control station, "Panther", the DEA regional office at Nassau, was replaced by "Pit Stop".

With the activation of USCG Cariball 2 on Great Exuma, sites "Echo" (Grand Exuma) and "Foxtrot" (Andros Island) are gone; only "India" (Great Inagua) remains active along



Although aerostat balloons, such as this one at Cudjoe Key, have been vulnerable -- especially to weather -- they have made a significant difference in airborne drug traffic.



AEROSTATS AND AIR FACILITIES - The small dots indicate locations of Customs, USAF and USCG aerostats. Surrounding each is a 150 mile radius circle which depicts the typical radar detection range to spot a small single-engine aircraft. The small dotted circle in the Yucatan Peninsula depicts the 50 mile radar coverage of a Coast Guard shipboard aerostat.

Triangles represent the locations of Customs air facilities; the three Xs are the Customs C3I centers.

Call Signs and Identifiers

ALMIGHTY	Customs at USN Base Guantanamo Bay, Cuba
AMBUSH	USAF/ANG radar unit, Dominican Republic
ATLAS	Rockwell Collins radio facility, Cedar Rapids, Iowa
BALLYHOO ###	Customs patrol boats
BAT	Short for Bahamas and Turks/Caicos Islands
BILLFISH	Customs marine unit support facility (vessel) Nassau, Bahamas
BLACK SHEEP	Customs AOB, San Angelo, Texas
BLUE FIRE	Customs Blue Fire Ops Center, Houston, Texas
BROADWAY	Customs Sector office, New York, New York
CAMELBACK	Customs AOU, Phoenix, Arizona
CHARLIE 3/C3	FAA ARTCC Miami, Florida
CHARLIE 20	FAA ARTCC Houston, Texas
CLAM BAKE	Customs Sector office, Boston, Massachusetts
COTHEN ###	Customs radio techs
CROWN CITY	Customs AOB, San Diego, California
DESERT BASE	Customs AOB, Tucson, Arizona
DOMINO	USAF air defense center, Tyndall AFB, Florida
EMPIRE	Customs AOU, Riverside, California
FLINT BASE	DEA Dallas, Texas
FRIED CHICKEN	Customs AOB, New Orleans, Louisiana
GHOST RIDER	FAA ARTCC Albuquerque, New Mexico
HAMMER	Customs C3I West Riverside, California
HAPPY HOUR	Customs Blue Lightning Ops Center, Gulfport, Mississippi
HOME PLATE	Customs AOB, Homestead AFB, Florida
JACKPOT	Customs AOB, Jacksonville, Florida
LONE STAR	Customs Sector office, Houston, Texas
LONG HORN	Customs AOU, Houston, Texas
MARLIN 395	(EPIC) El Paso Intelligence Center-performs computer checks on vessels for Shark units (via Atlas patch)
MUSHROOM	Customs AOU, Tampa, Florida
OCEANSIDE 300	Customs Blue Lightning Ops Center, Miami, Florida
OPBAT	Operation BAT, DEA sponsored ops in BAT area
OVERLORD	Customs National Command Center, Oklahoma, Oklahoma
PAN HANDLE	Customs AOU, Pensacola, Florida
PANTHER	DEA regional HQ, Nassau, Bahamas
PARADISE	Customs Sector office, San Juan, Puerto Rico
PING PONG	Customs SOC, Corpus Christi, Texas
PIT STOP	USAF/ANG radar net controller for military ground radar units
RAINBOW	?TC radar British Virgin Islands
RANCH HOUSE	US military radar, Providenciales, Caicos Islands
RAZOR BACK	Customs AOB, Puerto Rico
RIVER CITY	Customs AOU, San Antonio, Texas
ROAD RUNNER	Customs AOB, Albuquerque, New Mexico
ROCK FISH ###	Customs patrol boats
SHARK + #s	USCG cutter
SHRIMP BOAT	Customs Sector office, New Orleans, Louisiana
SLINGSHOT	Customs C3I East, Miami, Florida
SLINGSHOT ALFA	Backup radio facility for Slingshot
SPRUCE GOOSE	Customs Sector office, Los Angeles, California
STAR FISH ###	Customs patrol boats
STING RAY ###	Customs patrol boats
STORM CLOUD	Customs vessel maintenance center, Miami, Florida
SUNSHINE	Customs Sector office, Miami, Florida
SWORDFISH + #s	USCG aircraft
TIGER SHARK ###	Customs patrol boats
TROPIC AIR	DEA Opa Locka, Florida
WHITE LAKE	Customs AOU, El Paso, Texas
WINTER WONDERLAND	Customs Sector office, Chicago, Illinois

The following are known or suspected of being individual Customs vessels:
 BILLFISH CAJUN QUEEN 245 GUNSLINGER 465 HOLIDAY INN 358
 IRON LIFTER 264 LADY DI 251 MORNING STAR PEARL 042 SEA
 BREEZE TIDE WALKER 288 WAVE RUNNER WINDJAMMER

The following are tactical call signs used by USAF/ANG mobile radar units deployed in various Bahama locations:

ALLEYCAT BOAT SAIL CHASTISE COFFIN CORNER COFFEE TABLE
 CRISCO CRUMPET DRYDEN FREEMASON GANGSTER MOTEL
 PYRAMID RETAIL ROADSTEAD SPIRIT

with stations Alfa ("Almighty"), Delta ("Ambush") and Papa ("Ranch House"; formerly "Bonnie Sue").

While Customs bears the brunt of open water operations, the Coast Guard has made effective use of its Key West-based surface-effect ships. Its go-fast boats, the 44-foot Fast Coastal Interceptors, are similar to the Customs Blue Thunders. For in-shore work, a new 24-foot modified Hurricane speedboat with an inflatable upper hull provides greater stability in rough surf.

During drug interdiction missions, Coast Guard vessels may use the tactical identifier "Shark" plus their hull numbers, or more recent Navy-type triglyphs like "Mike Two November". These cutters can be heard patching through Atlas to "Marlin 395" which is part of EPIC, The DEA's computerized drug intelligence data bank. Small CG boats operating with Customs marine units ID with a "Kilo" prefix plus numbers.

US Navy

The Navy presence in drug interdiction has been minimal; you don't need an Aegis cruiser to tackle a smuggler's yacht! The Navy's contributions are destroyers, frigates and amphibious warfare ships. For certain missions in the Florida Keys area, the Navy has employed its Pegasus hydrofoils.

Sea Interdiction... More diplomacy

The Coast Guard is the only US agency that has the legal right to stop and board vessels; for this reason, a USCG law enforcement detachment (LEDET) is carried aboard USN warships participating in anti-narcotic operations. When US anti-drug forces operate within territorial waters of the Bahamas, Turks and Caicos Islands, they must carry law enforcement representatives from those nations.

In order to conduct a thorough search of a foreign flag vessel stopped outside of US territorial waters, permission from the vessel's registry nation must be obtained.

Atlas

Atlas is the Rockwell-Collins communications complex at Cedar Rapids, Iowa, with remote radio facilities at Richardson, Texas, and Newport Beach, California. It is contracted by the US government as a communication interface, but is not a DEA nor Customs facility. Atlas is basically an answering, message relay and phone patch

service for several US government agencies.

Although Atlas utilizes many HF frequencies, those most active in the antidrug operations include: Bravo (5841), Echo (11076), Papa (14686), Sierra India (18171) and India (23402.5) kHz USB. The venerable Atlas daytime primary Hotel (18666 kHz) has been replaced by Sierra India; Papa and India are normally alternate day frequencies.

DEA and Customs, when involved in a joint operation, may intercommunicate on Atlas circuits. Atlas can also turn up on Customs frequencies. During an initial call-up, Atlas will often simulkey on several frequencies, finally working the desired station only on one of them.

Drug Enforcement Administration

In the war on drugs, the DEA remains purposely covert, but what they accomplish is just as important as their more visible counterparts. Outside of the U.S., DEA's main areas of operation are Mexico, Caribbean, Central and South America. Here they infiltrate and gather intelligence as well as participate in strike operations against the drug cartels' operations.

DEA call signs include "Flint" plus two numbers (aircraft) or plus three numbers (air agents). Foreign locations include "Panther" (described earlier), "Condor", "Jaguar", "Sea Breeze" and "Sundance"; there are also U.S. air facilities like "Tropic Air" and "Flint Base". Little is known about DEA's HF radio communications or even their aircraft, said to be vintage single and twin engine types and some old commercial airline models.

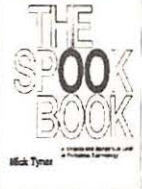
A Glimpse into the Future

In the future we may see the cartels modifying existing aircraft or propose building new ones, utilizing stealth as a means to thwart radar detection. At sea the transport medium might shift to under rather than on the water. Improvements in concealment on shipments sent via unsuspecting carriers will continue and the oldest of all smuggling techniques, the overland method, will remain a viable option so long as there are smugglers.

Radio communications, too, will continue to evolve. Improvements in security could all but do away with clear voice transmissions, with those remaining intelligible transmissions incorporating constantly changing tactical call signs. In the netherworld of drugs and interdiction, time does not stand still.

mt

<h3>Coast Guard Radio</h3> <p>A Guide to Using and Monitoring US Coast Guard Communications by James T. Pogue.</p> <p>Full listings of all US Coast Guard vessels, aircraft and installations. Frequencies, call signs, addresses, weather and Notice to Mariners broadcasts, Loran, history, organization, much more. \$12.95 + \$2 s/h (\$3 foreign)</p>	
<p>The Warship Directory Vol 1 - US, Canada, Great Britain. US Navy, Military & Sealift Command, Coast Guard, Army, NOAA, research vessels, Canadian Navy & British Navy. Plus radio call signs and frequencies. \$14.95 + \$2 s/h (\$3 foreign)</p>	<p>The Scanner Listener's Handbook How to Hear More on Your Scanner Radio Explore 25 - 2000 MHz. Band allocations, users, scanners, antennas, accessories, listening laws, equipment, information sources, more. \$14.95 + \$2 s/h (\$3 foreign)</p>
<p>Order now from your radio book dealer or  Tiare Publications PO Box 493M, Lake Geneva WI 53147 Catalog \$1, free with order. Visa/MasterCard</p>	




Forbidden Technologies

The Spook Book deals head on with Electronic Surveillance, Countermeasures, Lock Picking, Rearming Hand Grenades, Amateur Rocket Weapons and much more. Favorably reviewed.
258 pages, 8.5x11, soft bound..... \$34.95 postage paid



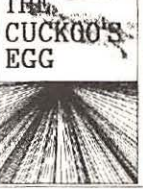
Surveillance Audio Amplifiers

SAA is a Surveillance Specialist cookbook. Covering any and all subjects concerning Audio Surveillance with no exceptions. From wiretapping to audio filtering, this is a must have publication.
277 pages, 8.5x11, soft bound..... \$34.95 postage paid



Now Hear This!

Electronic Eavesdropping Equipment Design
Full of detailed professional quality schematics and plans for all types of Electronic Surveillance Equipment. Excellent book!
110 pages, 8.5x11, soft..... \$34.95 postage paid



The Cuckoo's Egg

Tracking a Spy Through the Maze of Computer Espionage
A true story you won't be able to stop reading. #1 "Best Seller"
325 pages, 6.5x9.5, hard bound..... \$24.95 postage paid

Perstor Systems.....High Capacity Hard Drive Controllers

Perstor Systems line of high capacity hard drive controllers allow you to increase the capacity of any MFM hard drive by 90%. A Seagate ST-4096 (80 meg.) drive will format to 146 megs. Installation available...No one beats our price. **CALL TODAY!**

Factory Distributors of:

- * Cap-Stun, non-lethal weapons
- * Israeli Gas Masks
- * Z-Tool, lockout tools
- * Forbidden Technology publications
- * Surveillance Electronics
- * Countermeasures Electronics
- * Perstor Systems, hard drive controllers

Licensed and Certified Counterintelligence Technicians on Staff

Send \$3.00 for Catalog (Refundable with order)

Advanced Electronic Technologies

Suite 173, 5800-A No. Sharon Amity Rd., Charlotte, NC 28215
 Order Toll Free 1-800-543-5207 Info/Tech (704)545-2681
 FAX (704)545-9061 Computer BBS (704)545-7076

It's difficult, it's illegal,
but it can be done.
Here's what you need to know to go

Cellular Phone Hopping

by Bruce Heatley

Curiosity killed the cat. Well, it hasn't done that to me -- yet -- but it surely drove me nuts trying to figure out cellular channel assignments in the Buffalo area.

There has been a lot of press about monitoring cellular telephones, but no one has come out with a better method to do so with some kind of order other than putting in the upper and lower limits in a search bank and hitting the search key.

I figured that, without getting too technical, there had to be a better way. This article condenses what turned out to be a six-month project. I can't tell you the frequencies to punch in for your local system, but I can save you some time in learning how to map your own system, and thus be better equipped to follow a conversation from sector to sector.

First off, I wrote to the FCC to ask for four things: cell locations of both wire and non-wire services, antenna height and power allocation, specific frequencies for each cell, and coverage maps of each cell where available. The FCC replied that such information was available at the public reference room at the Commission's Mobile Services Division, Room 628, 1919 M St. N.W., Washington, D.C. 20054. If you're not able to perform the research yourself, they provided an agency which will contract to perform the research for you at the rate of \$22 per hour plus eight cents per page for duplication.

Not wanting to make a trek to D.C. at the time, I chose the research company. The ITS (International Transcription Services) can be contacted at 2100 M Street N.W., Suite 140, Washington, D.C. 20037, [202] 857-3800. They provided me with a great deal of information, the most valuable being the licensing documents called the Mobile Radio Authorization, FCC Form 463. These provided the exact antenna location for each cell, among other data.

Once you receive the licensing info, you should be home free to do your channel searching. There were some minor mistakes in the forms from the FCC -- nothing unusual about that -- but it was a great starting point.

At this point there is some additional material I feel is worth the investment. First from the printing office: Code of Federal Regulations, volume 47: part 80 to end, \$22 (general coverage); and part 20 through 39, \$18 (cellular and satellite). These are

available from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.

Without a doubt Part 90 (contained within part 80 to end) was the most complete listing of two-way communications I've ever seen -- absolutely a "must" for all scanner buffs. Included are the allocations for 800 MHz and above, including channel groups for trunked radios. If nothing else, this surpasses all the other reference books I've read. The other book that covers part 22 (cellular) is only for purists who really need to know all the details. Personally I was disappointed with this volume. Most of it was accounting methods for the carriers. Hardly of much interest.

Two other books of note: *Introducing Cellular Communications* by Stan Prentiss (Tab), and *Scanner Modification Handbook* by Bill Cheek (CRB Research). I highly recommend Bill's book. Though it is based around the Radio Shack 2004, 5 and 6 scanners, there are other scanning tips well worth it.

To get an idea what an area map is like, Figures 1 is the nonwire system -- Buffalo Tel. -- with 15 locations.

Two of these went on line as I was doing my research (south Cheektowaga and Niagara Falls). Most of the cells have more than one "sector." Six of them have three sectors, 120 degrees apart from one another, with only one exception where two sectors overlap -- the main downtown cell and the MTSO (Mobile Telephone Switching Office) for Buffalo Telephone on top of the Rand Building.

If there are a few cells you are particularly interested in, you may want to request additional documentation on them. Tables MOB-2 and MOB-3 will more specific engineering data on any

specific antenna. I found the MOB-3 table in Figure 2 interesting. To all of you two-way radio operators out there, notice the range comparison between the major lobe and off axis. Look how far a fraction of a watt goes.

All of these are public record, but don't tell the carriers this. They seem to think these are top secret and won't give you the time of day -- or at least not the *right* time. To make a point, I asked people from the engineering department of the nonwire company and the engineers at the district field office of the FCC if there were plans to use the expanded system. Both said no. In October 1990 nine channels were added to the downtown cell in the expanded system. Nice, huh? Just when I was getting bored.

The map in Figure 3 shows the overlapping downtown sectors. The black dots are other cells and Lake Erie is the bottom left corner. Which brings up one problem unique to my area -- Canada. Since we are neighbors, there was some overlapping of coverage. You couldn't always tell what you were hearing, let alone where it was coming from.

Fig. 1

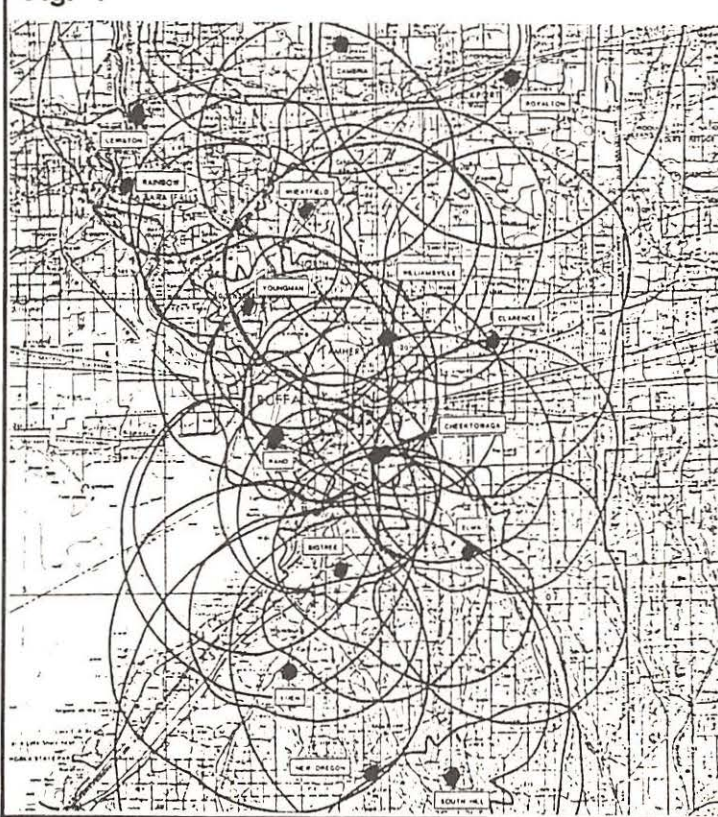


Table MOB-2
There are 1 Table MOB-2's with this Schedule B. This is Table MOB-2 number 1 of Schedule B number 1

a. Antenna Status
1 Existing 2 ☒ Proposed

b. Make of Antenna
Sinclair

c. Type No. of Antenna
SRL410C-4R60

d. Directions of Maximum Gain
N 0° E

e. Maximum Antenna Gain
13.5 Decibels

f. Maximum Effective Radiated Power
100.00 Watts

g. Height of Antenna Tip Above Level
996 Feet

h. Beam Width of Major Lobe of Antenna Pattern
60 Degrees

i. Polarization (Mark "X" One):
1 ☒ Vertical 2 ☐ Horizontal

Table MOB-3: HEIGHT AND POWER ENGINEERING DATA
There are 2 Table MOB-3's with this Schedule B. This is Table MOB-3 number 1 of Schedule B number 1

FCC Use Only Transmitter No.	Line No.	(1) Frequency (MHz)	(2) Class of Station (Enter Code)	(3) Radial Bearing (Degrees From True North)	(4) Average Elevation Above Radial (2-10 mi.) Above Mean Sea Level (Feet)	(5) Height of Antenna Radiation Center Above Average Elevation of Radial (2-10 mi.) (Feet)	(6) Effective Radiated Power in Radial Direction (Watts)	(7) Distance to Reliable Service Area Contour (Miles)
	1	870-880	BS					
	2	879.99	SAME					
	3							
	4							
	5							
	6							
	7							

Figure 2

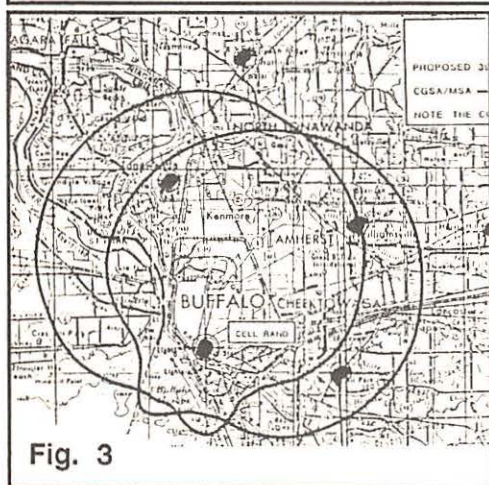


Fig. 3

Figures 4 and 5 are the channel groups for the basic systems. Figure 4 is what the nonwire system uses and that is where I'll reference the Buffalo system. Figure 5 is what the wire system uses (NYNEX).

I got lucky with NYNEX since they provided a summary, giving channel numbers and frequency groups for each sector. Also, NYNEX has only 12 cells and all single sectors, mostly omni-directional. Not so with Buffalo Telephone. To make matters worse, Buffalo Telephone, with more locations and multiple sectors, has about two or three times the channel loading activity. I'm glad I didn't try this in Chicago or Cleveland!

Mapping the System

When you arrive at the cell site, scan the "set-up" (digital) channels -- for the Buffalo system that meant 21 of them for each system between 879.39 and 879.99 for the nonwire, or between 880.02 and 880.62 for the wire system -- to determine the number of sectors if you can't tell by the antennas. One channel is assigned per sector.

Each antenna can handle up to 16

channels on transmit; a separate antenna is for receive. Directional antennas will have wings (reflectors) adjusted between 90 and 270 degrees. The wider the spread the wider the pattern. NYNEX's MTSO is pointed east to protect Ontario. Buffalo Telephone's south Cheektowaga cell with three sectors have adjustable arms to change the patterns of each sector, a most interesting design.

If the cell has only one sector, great. If not, expect problems isolating each one. It's not as easy as it sounds. If it is out in the open, it shouldn't be too bad, but if it is downtown or any semi-urban area, reflections and frequency can cause a real problem.

Here is where a scanner with a meter comes into play. Some of this I couldn't have done without the signal strength meter on my 2004. Go one-quarter mile or less away from the site and in line with the sector antenna for a search of the following groups, depending on whether it is wire or nonwire:

Nonwire	Wire
Basic	
870.03-879.36	880.65-889.98
312 channels	312 channels
Expanded	
869.04-869.99	891.51-893.97
33 channels	83 channels
890.01-891.48	
50 channels	

As you can see, the good old FCC, to keep things interesting, splits assignments up.

Expect to spend an hour or more at each location, depending on location and how complex the site is. After one sector is logged by using either of the tables in Figure 5 and 6, you should see a pattern developing. Once that is known, the rest of the system should use the same make-up. My method was to mark off each channel as it was found.

If you don't have a meter, use an attenuator if the radio has one, or disconnect the cable. Just be sure you are receiving the right pattern. After the first sector, drive around to the next one's pattern. Of course, a map is a must and you must know your directions to do it right.

Shown in Figure 6 are typical sites which can be found anywhere and everywhere -- on tall buildings, watertowers, shared with other antenna farm towers, and sometimes hidden where only the farmer's cows know where (and probably where only the cows can get to them).

Putting Your Map to Work

Now, that leaves us with what to do with all these channels. If your scanner has only 20 or 40 channels, you have a problem. Even a 100 channel unit makes it very limited. The ideal set-up would be a bank with 15 channels each.

AOR used to make a model that would have done the trick, but it was discontinued. My rig is the Radio Shack 2004 with an extra memory chip "stacked" above the existing one. A flip of a switch gives me 800 channels: the wire in one position and the nonwire in the other with space left over. The basic idea is to allow one bank per sector, or cell if it is omni-directional. Remember, there will be 15 channels using the 21 group system and 45 channels using the seven group system.

I made up cards, each one being a group of channels, so I could spread them out in front of me to make it easier to arrange them in some kind of order. After they were entered, I made a small chart listing the bank number and channel numbers along with the location and direction.

With some skill, you can narrow down the number of channels when a handoff occurs. Since no other channel in that cell or sector would be used and the call will only wind up

1	2	3	4	5	6	7	8	9	10	11	12
870.030	870.060	870.090	870.120	870.150	870.180	870.210	870.240	870.270	870.300	870.330	870.360
870.660	870.690	870.720	870.750	870.780	870.810	870.840	870.870	870.900	870.930	870.960	870.990
871.290	871.320	871.350	871.380	871.410	871.440	871.470	871.500	871.530	871.560	871.590	871.620
871.920	871.950	871.980	872.010	872.040	872.070	872.100	872.130	872.160	872.190	872.220	872.250
872.550	872.580	872.610	872.640	872.670	872.700	872.730	872.760	872.790	872.820	872.850	872.880
873.180	873.210	873.240	873.270	873.300	873.330	873.360	873.390	873.420	873.450	873.480	873.510
873.810	873.840	873.870	873.900	873.930	873.960	873.990	874.020	874.050	874.080	874.110	874.140
874.440	874.470	874.500	874.530	874.560	874.590	874.620	874.650	874.680	874.710	874.740	874.770
875.070	875.100	875.130	875.160	875.190	875.220	875.250	875.280	875.310	875.340	875.370	875.400
875.700	875.730	875.760	875.790	875.820	875.850	875.880	875.910	875.940	875.970	876.000	876.030
876.330	876.360	876.390	876.420	876.450	876.480	876.510	876.540	876.570	876.600	876.630	876.660
876.960	876.990	877.020	877.050	877.080	877.110	877.140	877.170	877.200	877.230	877.260	877.290
877.590	877.620	877.650	877.680	877.710	877.740	877.770	877.800	877.830	877.860	877.890	877.920
878.220	878.250	878.280	878.310	878.340	878.370	878.400	878.430	878.460	878.490	878.520	878.550
878.850	878.880	878.910	878.940	878.970	879.000	879.030	879.060	879.090	879.120	879.150	879.180

13	14	15	16	17	18	19	20	21
870.390	870.420	870.450	870.480	870.510	870.540	870.570	870.600	870.630
871.020	871.050	871.080	871.110	871.140	871.170	871.200	871.230	871.260
871.650	871.680	871.710	871.740	871.770	871.800	871.830	871.860	871.890
872.280	872.310	872.340	872.370	872.400	872.430	872.460	872.490	872.520
872.910	872.940	872.970	873.000	873.030	873.060	873.090	873.120	873.150
873.540	873.570	873.600	873.630	873.660	873.690	873.720	873.750	873.780
874.170	874.200	874.230	874.260	874.290	874.320	874.350	874.380	874.410
874.800	874.830	874.860	874.890	874.920	874.950	874.980	875.010	875.040
875.430	875.460	875.490	875.520	875.550	875.580	875.610	875.640	875.670
876.060	876.090	876.120	876.150	876.180	876.210	876.240	876.270	876.300
876.690	876.720	876.750	876.780	876.810	876.840	876.870	876.900	876.930
877.320	877.350	877.380	877.410	877.440	877.470	877.500	877.530	877.560
877.950	877.980	878.010	878.040	878.070	878.100	878.130	878.160	878.190
878.580	878.610	878.640	878.670	878.700	878.730	878.760	878.790	878.820
879.210	879.240	879.270	879.300	879.330	879.360			

Set-up

Freq.

879.390
879.420
879.450
879.480
879.510
879.540
879.570
879.600
879.630
879.660
879.690
879.720
879.750
879.780
879.810
879.840
879.870
879.900
879.930
879.960
879.990

Fig. 4

Fig. 4

Fig. 5	CELL A	CELL B	CELL C	CELL D	CELL E	CELL F	CELL G
	889.890	889.920	889.950	889.980	889.800	889.830	889.860
	889.680	889.710	889.740	889.770	889.590	889.620	889.650
	889.470	889.500	889.530	889.560	889.380	889.410	889.440
	889.260	889.290	889.320	889.350	889.170	889.200	889.230
	889.050	889.080	889.110	889.140	889.960	889.990	889.820
	888.840	888.870	888.900	888.930	888.750	888.780	888.810
	888.630	888.660	888.690	888.720	888.540	888.570	888.600
	888.420	888.450	888.480	888.510	888.330	888.360	888.390
	888.210	888.240	888.270	888.300	888.120	888.150	888.180
	888.000	888.030	888.060	888.090	887.910	887.940	887.970
	887.790	887.820	887.850	887.880	887.700	887.730	887.760
	887.580	887.610	887.640	887.670	887.490	887.520	887.550
	887.370	887.400	887.430	887.460	887.280	887.310	887.340
	887.160	887.190	887.220	887.250	887.070	887.100	887.130
	886.950	886.980	887.010	887.040	886.860	886.890	886.920
	886.740	886.770	886.800	886.830	886.650	886.680	886.710
	886.530	886.560	886.590	886.620	886.440	886.470	886.500
	886.320	886.350	886.380	886.410	886.230	886.260	886.290
	886.110	886.140	886.170	886.200	886.020	886.050	886.080
	885.900	885.930	885.960	885.990	885.810	885.840	885.870
	885.690	885.720	885.750	885.780	885.600	885.630	885.660
	885.480	885.510	885.540	885.570	885.390	885.420	885.450
	885.270	885.300	885.330	885.360	885.180	885.210	885.240
	885.060	885.090	885.120	885.150	884.970	885.000	885.030
	884.850	884.880	884.910	884.940	884.760	884.790	884.820
	884.640	884.670	884.700	884.730	884.550	884.580	884.610
	884.430	884.460	884.490	884.520	884.340	884.370	884.400
	884.220	884.250	884.280	884.310	884.130	884.160	884.190
	884.010	884.040	884.070	884.100	883.920	883.950	883.980
	883.800	883.830	883.860	883.890	883.710	883.740	883.770
	883.590	883.620	883.650	883.680	883.500	883.530	883.560
	883.380	883.410	883.440	883.470	883.290	883.320	883.350
	883.170	883.200	883.230	883.260	883.080	883.110	883.140
	882.960	882.990	883.020	883.050	882.870	882.900	882.930
	882.750	882.780	882.810	882.840	882.660	882.690	882.720
	882.540	882.570	882.600	882.630	882.450	882.480	882.510
	882.330	882.360	882.390	882.420	882.240	882.270	882.300
	882.120	882.150	882.180	882.210	882.030	882.060	882.090
	881.910	881.940	881.970	882.000	881.820	881.850	881.880
	881.700	881.730	881.760	881.790	881.610	881.640	881.670
	881.490	881.520	881.550	881.580	881.400	881.430	881.460
	881.280	881.310	881.340	881.370	881.190	881.220	881.250
	881.070	881.100	881.130	881.160	880.980	881.010	881.040
	880.860	880.890	880.920	880.950	880.770	880.800	880.830
	880.650	880.680	880.710	880.740	880.560	880.590	880.620
	880.440	880.470	880.500	880.530	880.350	880.380	880.410
	880.230	880.260	880.290	880.320	880.140	880.170	880.200
	880.020	880.050	880.080	880.110	880.000	880.000	880.000

in an adjacent cell or sector, a good portion of the possibilities are eliminated. Eventually, you would know where the call was coming from.

The expanded system is not included since I don't have a clue to the pattern it would follow, since it is split on one system and continuous with the other. Any help here would be appreciated.

Using the table at the top of Figure 6, here are the assignments for Buffalo Telephone as of the end of 1990: The letters are the direction of the major lobe and the numbers are the groups.

1. Rand N-16, 18; NE-14; S-6, first nine channels of 8, 10
2. Clarence last 11 of 20
3. Hoffman (Wheatfield) N-last 9 of 19; SE-13; SW-1
4. Eden last 8 of 13, first 4 of 17
5. E.Aurora (Elma) N-last 7 of 7, SE-last 9 of 5, SW-last 6 of 15
6. Royalton last 11 of 18
7. New Oregon last 10 of 19
8. Lewiston
9. Glenwood (S. Hill) last 6 of 9
10. Williamsville NE-6, 15; S-17; NW-2; last 6 of 8, 21
11. Lockport (Cambria) NE-NW first 6 of 16; E-W last 7 of 3
12. Tonawanda N-9; SE-5, 11
13. Orchard Park (Big Tree) N-4; SE-last 12 of 11; SW-last 11 of 17
14. South Cheektowaga NW-12; E-last 11 of 3, First 8 of 9; SW-1
15. Niagara Falls (Rainbow) E-10, first 4 of 19

The expanded frequencies for the Rand Building are as follows:

N or NE	890.04	S	869.43
	.40		.79
869.28	.76		
.64	891.12		
	.48		

In Closing

It doesn't seem as though much time has passed since the FCC eliminated UHF channels 70-83 in 1974 and then created the cellular telephone service in 1981. Nor does it cease to be amazing what people will talk about at up to and over \$1 a minute!

At least now, when there is a handoff (changing from one cell or sector to another), you should have a better chance of following those conversations ... that is, if you are fast.

Fig. 6

LOCATION NO. 010		LATITUDE: 42 05 05 N	LONGITUDE: 078 40 08 W
		KISSING BRIDGE SKI AREA, OFF ARBOIT HILL ROAD AND MANCHESTER ROAD	
		CITY: CONCORD	COUNTY: TRIF
		STATE: NEW YORK	
		ANTENNA MARKINGS: NONE	
LOCATION NO. 011		LATITUDE: 42 56 50 N	LONGITUDE: 078 52 22 W
		MISO COLOCATION 99, 103, 107 AND 129 ROSALIA STREET	
		CITY: BUFFALO	COUNTY: TRIF
		STATE: NEW YORK	
		ANTENNA MARKINGS IN ACCORDANCE WITH PARAGRAPHS 1, 3, 11, 21 & 22 OF FCC FORM 215	
LOCATION NO. 012		LATITUDE: 43 05 47 N	LONGITUDE: 079 03 09 W
		NIAGARA TOWERS	
		CITY: NIAGARA FALLS	COUNTY: TRIF
		STATE: NEW YORK	

COMMUNICATIONS ELECTRONICS INC.

Emergency Operations Center has expanded to our new two acre facility and World Headquarters. Because of our growth, CEI is now your *one stop source* for emergency response equipment. When you have a command, control or communications need, essential emergency supplies can be rushed to you by CEI. As always, for over twenty two years, we're here and ready to help.

Our RELM two-way radio transceivers were especially created for government agencies. When you need to talk to police, fire, ambulance, or state, federal and international response forces, RELM transceivers may be quickly programmed for up to 48 frequencies. Listed below, are some of our most asked about transceivers. For additional assistance, call CEI at 313-996-8888.

NEW! RELM® RSP500-A

List price \$465.00/CE price \$319.95/SPECIAL
20 Channel • 5 Watt • Handheld Transceiver
Frequency range: 148-174 MHz. continuous coverage. Will also work 134-148 MHz. with reduced performance. The RELM RSP500-A is our most popular programmable 5 watt, 20 channel handheld transceiver. You can scan 20 channels at up to 40 channels per second. It includes CTCSS tone and digital coded squelch. Snap on batteries give you plenty of power. Additional features such as time-out timer, busy-channel lockout, cloning, plug-in programming and IBM PC compatibility are standard. It is F.C.C. type accepted for data transmission and D.O.C. approved. We recommend also ordering the BC45 rapid charge 1 1/2 hour desk battery charger for \$99.95, a deluxe leather case LC45 for \$48.95 and an external speaker microphone with clip SM45 for \$59.95. Since this radio is programmed with an external programmer, be sure to also order one PM45 at \$74.95 for your radio system.

NEW! RELM® UC102/UC202

List price \$128.33/CE price \$79.95/SPECIAL
Now...Handheld gear you can afford.
CEI understands that all agencies want excellent communications capability, but most departments are strapped for funds. To help, CEI now offers a special package deal on the RELM UC102 one watt transceiver. You get a UC102 handheld transceiver on 154.5700 MHz., flexible antenna, battery charger and battery pack for only \$79.95. If you want even more power, order the RELM UC202 two watt transceiver for only \$114.95.

NEW! RELM® RH256NB-A

List price \$449.95/CE price \$299.95/SPECIAL
16 Channel • 25 Watt Transceiver • Priority Time-out timer • Off Hook Priority Channel
The RELM RH256NB is the updated version of the popular RELM RH256B sixteen-channel VHF land mobile transceiver. The radio technician maintaining your radio system can store up to 16 frequencies without an external programming tool. All radios come with CTCSS tone and scanning capabilities. This transceiver even has a priority function. A 60 Watt VHF 150-162 MHz. version called the RH606B is available for \$429.95. A UHF 15 watt, 16 channel similar version of this radio called the LMU15B-A is also available and covers 450-482 MHz. for only \$339.95. An external programming unit SPM2 for \$49.95 is needed for programming the LMU15B.

NEW! RELM® LMV2548B-A

List price \$423.33/CE price \$289.95/SPECIAL
48 Channel • 25 Watt Transceiver • Priority
RELM's new LMV2548B gives you up to 48 channels which can be organized into 4 separate scan areas for convenient grouping of channels and improved communications efficiency. With an external programmer, your radio technician can reprogram this radio in minutes with the PM100A programmer for \$99.95 without even opening the transceiver. A similar 16 channel, 60 watt unit called the RMV60B is available for \$489.95. A low band version called the RML60A for 30-43.000 MHz. or the RML60B for 37-50.000 MHz. is also available for \$489.95.

RELM® Programming Tools

If you are the dealer or radio technician maintaining your own radio system, you **must** order a programming tool to activate various transceivers. The **PKIT010** for \$149.95 is designed to program almost all RELM radios by interconnecting between a MS/DOS PC and the radio. The **PM100A** for \$99.95 is designed to externally program the RMV60B, RML60A, RML60B and LMV2548 radios. The **SPM2** for \$49.95 is for the LMV25B and LMU15B transceivers. The **RMP1** for \$49.95 is for the RMU45B transceiver. *Programmers must be used with caution and only by qualified personnel because incorrect programming can cause severe interference and disruption to operating communications systems.*

★★★ Uniden CB Radios ★★★

The Uniden line of Citizens Band Radio transceivers is designed to give you emergency communications at a reasonable price. Uniden CB radios are so reliable they have a two year limited warranty.

PRO310E-A3 Uniden 40 Ch. Portable/Mobile CB...\$72.95
PRO330E-A3 Uniden 40 Ch. Remote mount CB...\$99.95
GRANT-A3 Uniden 40 channel SSB CB mobile...\$152.95
PC122-A3 Uniden 40 channel SSB CB mobile...\$113.95
PC66A-A Uniden 40 channel CB Mobile...\$78.95
PRO510XL-A3 Uniden 40 channel CB Mobile...\$34.95
PRO520XL-A3 Uniden 40 channel CB Mobile...\$49.95
PRO535E-A3 Uniden 40 channel CB Mobile...\$73.95
PRO538W-A3 Uniden 40 ch. weather CB Mobile...\$78.95
PRO640E-A3 Uniden 40 ch. SSB CB mobile...\$133.95
PRO810E-A3 Uniden 40 channel SSB CB Base...\$174.95

★★★ Uniden Radar Detectors ★★★

Buy the finest Uniden radar detectors from CEI today.
CARD-A3 Uniden credit card size radar detector...\$127.95
RD3XL-A3 Uniden 3 band radar detector...\$124.95
RD9GTL-A3 Uniden "Passport" size radar detector...\$89.95
RD9XL-A3 Uniden "micro" size radar detector...\$107.95
RD25-A3 Uniden visor mount radar detector...\$54.95

Bearcat® 200XLT-A

List price \$509.95/CE price \$239.95/SPECIAL
12-Band, 200 Channel • 800 MHz. Handheld Search • Limit • Hold • Priority • Lockout
Frequency range: 29-54, 118-174, 406-512, 806-956 MHz. Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz. The Bearcat 200XLT sets a new standard for handheld scanners in performance and dependability. This full featured unit has 200 programmable channels with 10 scanning banks and 12 band coverage. If you want a very similar model without the 800 MHz. band and 100 channels, order the **BC 100XLT-A3** for only \$179.95. Includes antenna, carrying case with belt loop, ni-cad battery pack, AC adapter and earphone. Order your scanner now.

Bearcat® 800XLT-A

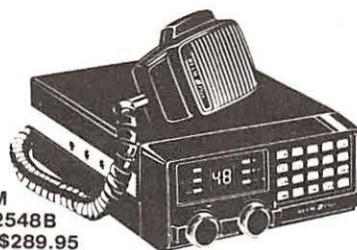
List price \$549.95/CE price \$239.95/SPECIAL
12-Band, 40 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC Bands: 29-54, 118-174, 406-512, 806-912 MHz. Now...nothing excluded in the 800-912 MHz band.
The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9 1/4" x 4 1/2" x 1 1/2". If you do not need the 800 MHz. band, a similar model called the **BC 210XLT-A** is available for \$178.95.

NEW! Uniden® MR8100-A

List price \$849.95/CE price \$486.95
12-Band, 100 Channel • Surveillance scanner Bands: 29-54, 116-174, 406-512, 806-956 MHz.
The Uniden MR8100 surveillance scanner is different from all other scanners. Originally designed for intelligence agencies, fire departments and public safety use, this scanner offers a breakthrough of new and enhanced features. Scan speed is almost 100 channels per second. You get four digit readout past the decimal point. Complete coverage of 800 MHz. band when programmed with a personal computer. Alphanumeric designation of channels, separate speaker, backlit LCD display and more. To activate the many unique features of the Uniden MR8100 a computer interface program is available for \$19.95. Due to manufacturers' territorial restrictions, the MR8100 is not available for direct shipment from CEI to CA, OR, WA, NV, ID or UT.

NEW! Ranger® RC12950-A

List price \$549.95/CE price \$249.95/SPECIAL
10 Meter Mobile Transceiver • Digital VFO Full Band Coverage • All-Mode Operation Backlit liquid crystal display • Repeater Splits RIT • 10 Programmable Memory Positions
Frequency Coverage: 28.0000 MHz. to 29.6999 MHz. The Ranger RC12950 Mobile 10 Meter Transceiver has everything you need for amateur radio communications. The RF power control feature in the RC12950 allows you to adjust the RF output power continuously from 1 watt through a full 25 watts output on USB, LSB and CW modes. You get a noise blanker, roger beep, PA mode, mike gain, digital VFO, built-in S/RFP/MSW/SWR meter. Frequency selections may be made from a switch on the microphone or the front panel. The RC12950 gives you AM, FM, USB, LSB or CW operation. For technical info, call Ranger at 619-259-0287.



RELM
LMV2548B
Only \$289.95

OTHER RADIOS AND ACCESSORIES

XC365-A Uniden Ultra Clear Plus Cordless Phone...\$89.95
CT785S-A Uniden speakerphone cordless phone...\$109.95
BC55XLT-A Bearcat 10 channel scanner...\$114.95
AD100-A Plug in wall charger for BC55XLT...\$14.95
PS001-A Cigarette lighter cable for BC55XLT...\$14.95
VC001-A Carrying case for BC55XLT...\$14.95
BC70XLT-A Bearcat 20 channel scanner...\$159.95
BC142XL-A Bearcat 10 ch. 10 band scanner...\$84.95
BC147XL-A Bearcat 16 ch. 10 band scanner...\$94.95
BC172XL-A Bearcat 20 ch. 11 band scanner...\$134.95
BC177XL-A Bearcat 16 ch. 11 band scanner...\$134.95
BC590XLT-A Bearcat 100 ch. 11 band scanner...\$254.95
BC760XLT-A Bearcat 100 ch. 12 band scanner...\$254.95
BC002-A CTCSS tone board for BC590/760XLT...\$54.95
BC003-A Switch assembly for BC590/760XLT...\$22.95
BC855XLT-A Bearcat 50 ch. 12 band scanner...\$199.95
BC1-A Bearcat Information scanner with CB...\$129.95
BC330A-A Bearcat Information scanner...\$99.95
BC560XLT-A Bearcat 16 ch. 10 band scanner...\$94.95
BP205-A Ni-Cad batt. pack for BC200/BC100XLT...\$39.95
ATS808-A Sangean shortwave receiver...\$159.95
ATS803A-A Sangean shortwave receiver...\$159.95
ATS800-A Sangean shortwave receiver...\$99.95
MS103-A Sangean shortwave receiver...\$84.95
74102-A Midland emergency weather receiver...\$39.95
77118-A Midland CB with VHF weather antenna...\$66.95
77118-A Midland CB mobile with VHF weather...\$62.95
77913-A Midland CB portable with VHF weather...\$79.95
76300-A Midland CB base station...\$92.95
FBE-A Frequency Directory for Eastern U.S.A...\$14.95
FBW-A Frequency Directory for Western U.S.A...\$14.95
RFD1-A MI, IL, IN, KY, OH, WI Frequency Directory...\$14.95
RFD2-A CT, ME, MA, NH, RI, VT Directory...\$14.95
RFD3-A DE, DC, MD, NJ, NY, PA, VA, WV Dir...\$14.95
RFD4-A AL, AR, FL, GA, LA, MS, NC, PR, SC, TN, VI...\$14.95
RFD5-A AK, ID, IA, MN, MT, NE, ND, OR, SD, WA, WY...\$14.95
RFD6-A CA, NV, UT, AZ, HI, GU Freq. Directory...\$14.95
RFD7-A CO, KS, MO, NM, OK, TX Freq. Directory...\$14.95
ASD-A Airplane Scanner Directory...\$14.95
TSG-G7 "Top Secret" Registry of U.S. Govt. Freq...\$16.95
TTC-A Tune in on telephone calls...\$14.95
CBH-A Big CB Handbook/AM/FM/Freeband...\$14.95
TIC-A Techniques for Intercepting Communications...\$14.95
RRF-A Railroad frequency directory...\$14.95
EEC-A Embassy & Espionage Communications...\$14.95
SMH-A Scanner Modification Handbook...\$16.95
LIN-A Latest Intelligence by James E. Tunnell...\$16.95
A60-A Magnet mount mobile scanner antenna...\$34.95
A70-A Base station scanner antenna...\$34.95
USAMM-A Mag mount VHF ant. w/ 12' cable...\$39.95
USAK-A 3/4" hole mount VHF ant. w/ 17' cable...\$34.95
Add \$4.00 shipping for all accessories ordered at the same time.
Add \$12.00 shipping per radio and \$4.00 per antenna.

BUY WITH CONFIDENCE

Michigan residents please add 4% sales tax or supply your tax I.D. number. Written purchase orders are accepted from approved government agencies and most well rated firms at a 10% surcharge for net 10 billing. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. All prices are in U.S. dollars. Out of stock items will be placed on backorder automatically or equivalent product substituted unless CEI is instructed differently. A \$5.00 additional handling fee will be charged for all orders with a merchandise total under \$50.00. Shipments are F.O.B. CEI warehouse in Ann Arbor, Michigan. No COD's. Not responsible for typographical errors.

Mail orders to: Communications Electronics, Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add \$12.00 per radio for U.P.S. ground shipping and handling in the continental U.S.A. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are two times continental U.S. rates. If you have a Discover, Visa, American Express or MasterCard, you may call and place a credit card order. 5% surcharge for billing to American Express. For credit card order, call toll-free in the U.S. Dial 800-USA-SCAN. For information call 313-996-8888. FAX anytime, dial 313-663-8888. Order today.

Scanner Distribution Center™ and CEI logos are trademarks of Communications Electronics Inc. Sale dates 12/15/90 - 6/30/91 AD #010591-A Copyright © 1991 Communications Electronics Inc.

For more information call 1-313-996-8888

Communications Electronics Inc. Emergency Operations Center
P.O. Box 1045 □ Ann Arbor, Michigan 48106-1045 U.S.A.
For orders call 313-996-8888 or FAX 313-663-8888

MAN: *The Human Receiver*

by Bob Grove

Two types of radiation, ionizing and non-ionizing, pervade our planet. Ionizing radiation is produced by nuclear energy -- radioactivity -- as unleashed by nuclear explosions and power plant accidents. It is also present in nature as attested to by the continuing concerns about radon gas in our homes.

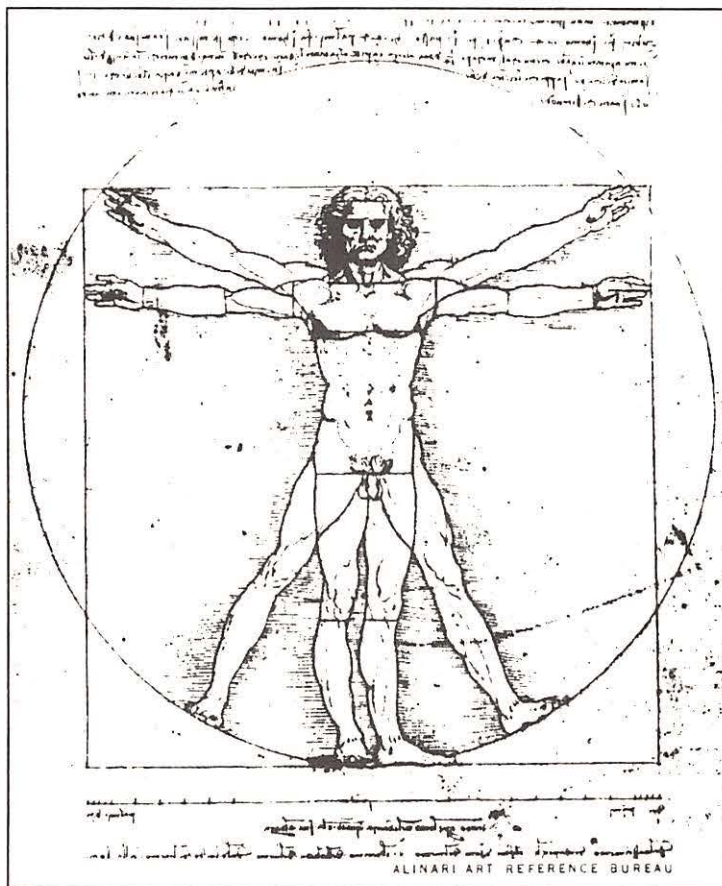
Non-ionizing electromagnetic radiation (NIEMR) is more insidious -- everywhere we look in our electric world we see its evidence -- in our homes, offices, vehicles and even on the open road.

The suspicion that radio waves and other forms of electromagnetic (EM) pollution may be harmful has been with us for decades. Early radar experiments cooked the experimenters; now scientists suspect that weaker energy fields like those produced by electric power lines may have delayed effects.

Some Alarming Statistics

Dr. Genevieve Matanoski of Johns Hopkins University claims that here is a disturbing link between human cancer and exposure to power lines. She cites the high level of cancer among telephone linemen and breast cancer among male repairmen working on central office switching equipment.

Data collected by the University of North Carolina suggest that pregnant women who use electric blankets are 70% more likely to induce leukemia and 130% more likely to induce brain cancer into their unborn children. Young children using electric blankets seem to have a 50% higher cancer rate and 90% higher leukemia incidence than non-electric-blanket users. Even electrically-



We know very little about the effects of electromagnetic radiation, but we already know it can affect health, mood, visual and audio perceptions and our mental health! How much is too much? And is there anything we can do about it?

heated water beds are suspect. Fortunately, the actual numbers of these cases are small.

So what is the government's official stance on the NIEMR question? The Environmental Protection Agency (EPA) issued a statement in June 1990 in which they observed that "there is a small but statistically significant correlation between electromagnetic fields and cancer." It is the *magnetic*, not electric, component of the fields that the EPA holds suspect.

White House Science Advisor D. Allan Bromley and Assistant Secretary of Health

James Mason withheld from the public for six months, ostensibly to prevent alarm, a portion of the report which concluded that there is "a consistent pattern of response which suggests ... a causal link" between electric power line radiation and leukemia, brain cancer and lymphoma among children. A summary of the EPA study was finally released in full in mid-December 1990.

Not unexpected, the U.S. Air Force, with its extensive deployment of video terminals and other electronics, blasted the report and EPA, saying that Air Force reviewers have never found any evidence of a link between electromagnetic fields and cancer. Further, they charged that the EPA "biased the entire document" to establish such a link.

We know very little about the hazards of electromagnetic radiation because of its recency, but when unexplained trash fires erupt spontaneously near power lines in Honolulu, or the incidence of Down's Syndrome (Mongolism) is unusually high in Vernon, New Jersey, the site of an enormous satellite transmitting complex, there is cause for concern.

Paul Brodeur, author of the books, *Currents of Death* and *The Zapping of America* (both published by Simon and Schuster), accuses the White House of "suppression and politicization of a major health issue." In the July 9, 1990, issue of the *New Yorker*, Brodeur reports increased cases of miscarriages, brain tumors, birth defects and cancers among residents near power lines. Some experts disagree with Brodeur whom they see as an alarmist fanning the flames of the popular press.

Most researchers do seem to agree, however, that long-term, nearby exposures

are more hazardous than short-term, distant exposures, and that simply restringing power line cables so that they are close together dramatically reduces their radiation. With this information now public, what are the legal ramifications for power companies who have done nothing to correct the problem?

The hazards of computer video display terminals have been well publicized, but how are they different from TV screens? They're not. But computer operators sit right in front of their screens, and only terminal couch potatoes get that close to their vidiot boxes! The lesson is to sit at least an arm's length away from the screen to significantly reduce the radiation hazard.

The December 1990 issue of the *American Journal of Industrial Medicine* reports a sharp increase in brain cancer cases over the last few years. There are concerns as well about antenna radiation from walkie-talkies, ham and CB radios, broadcasting transmitters, and cellular and cordless telephones. While some of these technologies may be relatively new, critics claim that the government is purposely avoiding such studies, afraid of the political consequences of revealing the truth.

In a faltering economy, homeowners near power lines are doubly hurt, finding their property values plummeting. Power companies could face lawsuits for maintaining wide-spaced, overhead power lines when they are aware that close spacing and underground placement dramatically reduce electromagnetic exposure. Obviously, homes, playgrounds and schools should not be close to high tension lines.

Other industries as well face staggering lawsuits brought by employees who feel that their disabilities were caused by electric and electronic equipment to which they were exposed. Computer operators should stay at least 30 inches from their screens (and 36 inches from the sides and back).

Like other forms of pollution, the cost to clean up the electromagnetic environment would filter down to the consumer who is already burdened by high taxes and economic recession.

A generation of experimentation ...

In the early 1970s, Dr. Ross Adey

discovered that low-level 16 Hz radiation would alter the flow of calcium ions in the brain; the U.S. Navy pulses their 420 MHz long-distance-radar bursts at 18.5 Hz, well within the "calcium window."

Dan Lyle, an associate of Adey's, discovered that a 60-Hz-modulated 450 MHz signal could alter the immune system. In England, Richard Dixey and Glen Rein showed that pulsed 500 Hz fields affect the body's neurotransmitters. What effect does the Navy's Project ELF 76 Hz transmitters have?

EM experiments with humans were reported long ago: 6.6 Hz caused depression, 11 Hz caused agitation and riotous behavior, 8 Hz produced elated feelings, and frequencies below 6.26 Hz induced confusion and anxiety. What are the consequences of the global 10 Hz radio pulses from the Russian "woodpecker"?

Red, green and blue color perception may be enhanced by placing electrodes on the subject's temples and introducing 42.5 and 77 Hz voltages. Robert Becker, in his recent book, *The Body Electric: Electromagnetism and the Foundations of Life*, states that 30-100 Hz electric fields, weaker than even the earth's natural magnetic field, interfere with the body's cycles and rhythms, producing chronic stress and impairment disease.

The human body's nervous system works on very minute pulses of electrical energy, typically a few millionths of a volt. The heart depolarizes, producing a beat, in only a quarter second. It doesn't take much induced EM to interfere with those tiny signal levels. Currents as low as 10 milliamperes produce pain, while those in the 100-200 milliamperes range are lethal.

Our earth is constantly bathed in waves of electromagnetic energy from the sun, the planets and even more distant heavenly bodies. How do these emanations influence our daily lives? What are their long term effects?

30 years ago Charles Susskind at the University of California, under a U.S. Air Force grant, demonstrated that 3-cm radar transmissions killed laboratory mice in front of a radar horn when their body temperature exceeded 111 degrees (your tax dollars inventing the microwave oven!). In 1962 Susskind and his assistant, Susan Prausnitz,

DISTINCTIVE RING SWITCH

Add additional phone numbers to a single line with the new Distinctive Ringing service from the phone company. RingDirector detects ring patterns and routes calls to phones, answering machines, FAX's or modems. 2-port \$89. 4-port \$149. S/H \$5. 1-800-677-7969 FAX 516-676-9225

EXCELLENT TECHNOLOGY
69 Smith Street, Glen Head, NY 11545

CSRA Communications

Rt. 3 Box 456
Sylvania, GA 30467
912-863-4333

Your authorized Wireman products dealer. Your source for wire, low loss cable, connectors, books, baluns, Larsen antennas, amateur and SWL accessories.

COD, cash, VISA, M/C accepted
24-hour answering service

"MT is the one magazine I read cover to cover"

-- 1991 Survey comment

published their daring conclusion that pulsed microwaves could cause leukemia.

In another experiment, ants lined up in a 3-cm. EM field, aligning their antennae parallel to the field in an effort to minimize the effect. Not surprising, since the antenna of an ant is very nearly a quarter wave resonator at 3 cm! The ant-alignment behavior was observed at frequencies as low as 9 MHz.

It was during that period that a report from the National Institute for Neurological Diseases warned that the frequency 388 MHz was noted to have a lethal effect on monkeys. Subsequent experiments with a milliwatt-power oscillator positioned several feet away from human subjects and swept through the 380-500 MHz range elicited a "pulsing in the brain," ringing in the ears -- and a powerful urge to sink their teeth into the experimenter!

In that experiment, each individual appeared to have his own "resonant" frequency, probably a function of the height of the body acting as a half-wave antenna. Most humans should resonate at around 82-

85 MHz (TV channel 6; do you live near a TV transmitter?).

Extremely low frequency brain waves have long been identified: delta (1-3 Hz) are related to deep sleep; theta (4-7 Hz) reflect mood; alpha (8-12 Hz) imply relaxation; and beta (13-22 Hz) are tied to conscious thought.

Externally-pulsed lights can alter behavior in the human: 6-7 Hz induces anger; 10 Hz is soothing but may trigger epileptic seizures in vulnerable subjects by synchronizing with the alpha waves. And there is the story about a man who involuntarily tries to strangle an adjacent patron every time he visits a movie house, triggered by the 24-frame-per-second film flicker!

Animals have their own sets of frequencies. Some snakes "hypnotize" their prey with a 3 Hz dance; many animals flea in terror when they hear vibrations in the 7-15 Hz range, possibly a primordial reaction to earthquakes. Infrasound (under 20 Hz) can take its toll in human adjustment as well, producing disorientation and even euphoria.

Professor Geraud, a French engineer, became ill from the continuous 7 Hz vibration of an office air conditioner. Noting that the sound generated by French police whistles had low frequency components, he built a six-foot, air-powered replica -- which killed his laboratory assistant with one blast!

Later experiments showed that high-intensity infrasound could destroy buildings at distances of five miles. Pulsing rock music mesmerize its audience while the soft, 1.2 Hz beat of a mother's heart soothes her baby.

By 1930 Nrunori claimed that humans react to radio emissions at 129 MHz and its harmonics, while in the 1920s, Cazzamalli bombarded volunteer subjects with VHF radiation to induce hallucinations. He also claimed to have recorded re-radiated "beats" of emotional reactions using an untuned galena crystal receiver and a galvanometer during the RF blitz from his "oscillatori telegrafica."

More recently, UHF fields reportedly change brainwave patterns in rabbits, alter



The human body's nervous system works on tiny pulses of electrical energy. It doesn't take much to interfere with those signal levels!

the heartbeat of chicken embryos, change the optical properties of glycogen (which supplies our muscles with energy), reduce conditioned reflexes in laboratory animals, increase visual sensitivity (while reducing color perception), expedite the regrowth of severed nerve tissue (in short exposures only; long-term exposure suppresses the regrowth), and affect our reaction to pain (weak fields are an analgesic while strong fields are painful). Fifteen-meter (21 MHz) signals increase the germination of gladiolus bulbs while ten meter (29 MHz) energy kills bugs in bread!

... And experimentation on a generation

The earth's natural magnetic field varies from place to place; could it have correspondingly varying effects on the human body as well as variably alter the effects of radiation?

One hypothesis suggests that NIEMR causes cancer by increasing the rate of cell reproduction (DNA and RNA alteration), by suppressing the immune system and by making abnormal cells resistant to the body's natural defense system.

Could it be that pulsed EM waves are the modern-day equivalent of the Chinese water torture, taking its toll on human mental health a little at a time? Could this partly explain our accelerating crime rate? Are we changing our evolution by altering our genetic structure?

Perhaps most important of all, can we do anything to protect ourselves? Absolutely. Don't live near high tension lines. Use underground power lines to your home and have them enter at an unoccupied part of the dwelling like the garage.

Keep at least an arm's length from CRT video screens. Install ham or CB transmitting antennas at least 20 feet away from occupied parts of the house. The higher the frequency, the greater the effect on tissue, especially the lens of the eye and the testicles. Use low transmit power -- linears are for sissies! Keep walkie-talkie transmissions short; portable cellular telephones at 800 MHz are particularly suspect. Warm your bed with an electric blanket *before you get in*, then switch it off when you slip under it. Keep several feet away from electric appliances -- line operated clocks, mixers, toasters and the like.

Activism

Suits against the perpetrators of this uninvited blitz of toxicity will probably increase. Charges of negligence, liability, nuisance, trespass and even battery have been successfully brought recently in similar cases. Join a recognized consumer lobby group. A collective voice IS heard in Washington!

mi

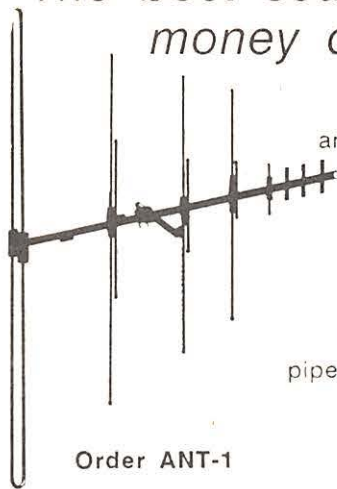
For those readers who wish additional information, an excellent overview of NIEMR health hazard studies and legal cases, complete with bibliography, appeared in the August, 1990, issue of *Trial* magazine, a publication of the American Trial Lawyers Association.

PRESSTIME SPECIAL!

AR-1000 Handheld Scanner, only \$379 plus \$5 UPS!
Save \$120 off manufacturer's former retail price!

The Grove Scanner Beam

*The best scanner antenna
money can buy!*



Order ANT-1

- 6-9 dB gain over other antennas. Continuous 30-512, 800-1300 MHz reception.
- Transmit up to 25 watts on 144, 220 and 420 MHz bands. 50/75 ohms nominal impedance.
- Balun transformer, offset pipe and all mounting hardware included.

Only \$59.95

\$5 UPS or
\$7 U.S. Parcel Post
\$10 Canadian Air P.P.

Uniden BC855XLT

*New Bearcat desktop
scanner includes 800 MHz!*

At last, a low-cost scanner with high-performance features! This new Bearcat desktop scanner offers a frequency coverage of 29-54, 108-174, 406-512 and 806-956 MHz (less cellular, restorable) as well as pre-programmed weather search.

50 memory channels in five banks may be scanned or searched at 5 or 15 steps per second. Individual channel lockout and delay, automatic squelch, priority, non-volatile memory and powerful, clear 1.3 watt audio included.

A BNC antenna jack, 18" plug-in telescopic whip, external speaker, wall power adaptor all included at this low price.

Order SCN-8

Only \$209

Plus \$5 UPS shipping in U.S.

Bearcat BC200XLT

Finally, a high performance handheld programmable scanner which includes aircraft and all land mobile bands, including 800 MHz!

Frequency coverage is 29-54, 118-174, 406-512, and 806-960 MHz (less cellular frequencies). 200 memory channels may be stored in 10 banks of 20 channels each or scanned sequentially.

This feature-packed handful offers ten priority channels, search, lockout, and delay and comes equipped with detachable Nicad battery pack, AC charger, leather holster, and BNC flex whip.

The BC200XLT is the most powerful hand-held scanner ever released to the public and is now available from Grove Enterprises at a super discount price!

Extra BP200 battery packs available - 39.00

CALL TOLL-FREE (MC & Visa Only)
1-800-438-8155

Grove Discount Price

Retail
~~\$449.95~~

\$259⁰⁰

Order SCN 9

\$5 UPS/\$6.50 U.S. Parcel Post
\$7 Canadian Air P.P.



Features may vary slightly from photo

Order Today!

Grove Enterprises
140 Dog Branch Road
Brasstown, NC 28902

Call 1-704-837-9200 or for
MC, Visa and COD orders
only: 1-800-438-8155

Rika Kobayashi

by Jeff Chanowitz



enabled her to work as an English announcer.

Five years ago, Kobayashi began her career at Radio Japan reading news and commentary on the air. A year later, she joined Radio Japan's production department. The first program she produced was "Hello Australasia," a program that covered topics pertaining to Japanese relations between Australia, New Zealand, and other countries within the Australasian region.

Currently, Kobayashi hosts and produces one of the most popular programs at Radio Japan. "It's all about music. Not just in Japan, but all round the world." That is how Rika describes her new program *Music Mix*. Each week the program features 7 to 8 different selections of music on a different theme. The songs on *Music Mix* range from Japanese traditional music to African Pop.

A Program for DXers

Since last year, Kobayashi has also produced and hosted the highly respected and extremely popular *DX Corner*. "It's very interesting. I like to receive the letters from all over the world and know what people overseas are feeling," says Kobayashi of her work on *DX Corner*.

Yet, putting together the program is not all fun. Each day Kobayashi sorts through dozens and dozens of DX reports that are telephoned, faxed, or mailed to Radio Japan. Then she arranges the DX information into a cohesive form that is taped on Saturday for airing on Sunday and Monday.

One of Kobayashi's biggest problems is that many of the reception reports sent in only give information about Radio Japan. Kobayashi candidly remarked, "I thank the listeners for writing, but I would really rather they tell us about the reception of other stations."

Aside from reports, Rika receives many cards and letters. Listener comments range from program suggestions to unusual questions. One memorable listener wanted to know if there were any UFOs in Japan!



Photo by Jim Smith

With a sweet sounding feminine voice, a dark-haired Japanese woman welcomes listeners with, "Hello from Tokyo and welcome to another edition of 'DX Corner.'"

That voice belongs to Rika Kobayashi. As a producer and host, Kobayashi is typical of Radio Japan's hardworking staff members that bring the world the latest news and programming from Tokyo.

Working in the gleaming white, multi-story NHK headquarters, which is located in the Shibuya district of Central Tokyo, Kobayashi is one of the 200 full-time staff members who broadcast in 21 different languages over 44 and a half hours a day. Kobayashi and other staff members attempt to bring news which is accurate and unbiased, and programs that provide information on the traditions and culture of modern Japan.

Rika grew up in Mosashino town (a suburb of Tokyo) not expecting a career in broadcasting. As she puts it, "I never really planned to get into radio or international broadcasting for that matter." While studying Sociology at Rikkyo University in Central Tokyo, Kobayashi passed a test at NHK that

In addition to letters from abroad, Kobayashi also receives comments from Japanese listeners. "DXers in Japan are a bit too serious," is Kobayashi's description of the difference between Japanese DXers and DXers abroad. She explained that DXers abroad provided more personal information and seemed a little bit more friendly.

By the end of each year, all this mail adds up to about 80,000 pieces of correspondence that have been received at Radio Japan's headquarters. About 60 percent of the letters come from India and Bangladesh. The rest arrive from the United States, Germany, Australia, Argentina and Brazil.

An Historical Perspective

In Japan, shortwave broadcasting has a long history. Starting in 1935, Japan's external service began broadcasting one-hour

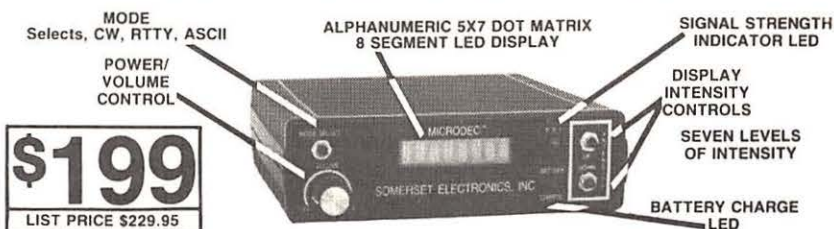
**If there's a pain in
your chest, be a
pain in the neck.**

Complain to a doctor.
Emergency



 **American Heart Association**

Add New Enjoyment To Your SW Receiver with the *MICRODEC™ Decoder



\$199
LIST PRICE \$229.95

MICRODEC™ decodes MORSE, RTTY, and ASCII to ALPHANUMERIC CHARACTERS

- Automatically tracks MORSE code speeds from 5 to 70 WPM
- Decodes 60, 67, 75, 100 wpm RTTY and 110, 330 BAUD ASCII.
- Standard ASCII port to interface with your computer.
- Internal practice code oscillator.
- Standard cockpit green display. (red & yellow optional)
- Power switch/Volume control/Internal speaker
- Completely portable with optional NICAD rechargeable batteries mounted internally. — \$29.95 (List \$49.95)
- Ultra compact and lightweight (1.5H X 5.08W x 5.25L)
- Optional display color: \$15.00 (List \$30.00) (red or yellow)
- Operates on DC voltages between 9 VDC and 15 VDC (AC/DC adapter provided at no cost).

SHIPPING AND HANDLING: Continental United States add \$8.50 for UPS ground. Florida residents add 6% sales tax. Other types of Express shipments and foreign destinations will be quoted on request.

METHODS OF PAYMENT: MasterCard, VISA, Money Orders, Certified Checks, and Personal Checks. (Please allow two weeks for personal checks to clear.) **QUANTITY DISCOUNT FOR HAM/SWL CLUBS.** Dealer Inquiries Welcome.

SOMERSET ELECTRONICS, INC.

1290 HIGHWAY A1A, SATELLITE BEACH, FL 32937 • ORDER & FAX: (407) 773-8097

transmissions to the West Coast of North America. In the next few years, the broadcasts were expanded to cover Japan's emerging colonial empire. With the end of World War II, however, the external broadcasts were banned by the Allied forces ruling Japan. It wasn't until February 1, 1952, that the international service was restarted under the new name Radio Japan.

It was also during the 1950s that the popularity of DXing peaked. Called the BCL boom, which is Japanese-English for broadcast listening, this period marked a time when shortwave was essential in obtaining news from abroad. The children of that era, who are now in their 40s and 50s, make up most of today's DX listeners.

In today's Japanese society, television and computers are alternative hobbies for people who used to be traditional shortwave listeners. This trend has led Kobayashi to make a rather gloomy statement about the future of shortwave: "While I am not certain of shortwave's future in Japan, I think *international* shortwave will survive."

Yet, the Japanese do tune to shortwave in certain situations. Kobayashi stated, "When in times of international emergencies, people tune in to shortwave in large numbers." During the crisis in the Middle East, many listeners in Japan tuned to shortwave for the latest news. Radio Japan also proved very crucial in relaying information to the Japanese hostages caught in Kuwait and Iraq.

"Please write us," encourages Kobayashi as her one request of listeners. This philosophy is also reflected in the listener

friendly attitude of Radio Japan. Verification cards are provided for all listeners sending in reception reports to Radio Japan. The address to write to is Radio Japan, 150-01 Tokyo, Japan.

To send in comments or information to "DX Corner," write to DX Corner, Radio Japan, 150-01, Tokyo, Japan. Because Radio Japan transmits from Japan and Canada, it's also best to write for a schedule or check the

Monitoring Times frequency section for the clearest transmission.

As for the future, Kobayashi hinted that she's quite interested in producing television programs, but she also emphasized a commitment that is typical of Radio Japan's staff, stating, "My main emphasis now is trying to do my best for listeners."





This QSL pictures Kaminarimon Gate in Asakusa, Tokyo. All reception reports sent to Radio Japan are acknowledged with a verification card.

Shortwave Broadcasting

Glenn Hauser

Box 1684-MT

Enid, OK 73702

ALBANIA Radio Tirana announced it would cut external output, dropping some languages; invited advertising! And ceased playing the "Internationale" (BBC Monitoring)

ANGOLA Huila heard on 4819.9 from 2153, with a Radio Nacional ID at 2216; then at 2218-2300 nothing but music on 5041.2, tentatively Benguela (Hans Johnson, MD, RCI SWL Digest)

Voz da Resistencia do Galo Negro is unheard on 4880, 6135, 7125, but only on high power 9700 at 0500-0830, 11830 at 1100-1430, 7100 at 1800-2200 (Richard Ginbey, Namibia, Radio Netherlands Media Network) Heard on 7100 from 2000 until sign-off around 2227; on Tuesday, Thursday and Sunday has international service from 2030 in English, 2058 in French, 2128 in Portuguese; all times vary widely, sometimes as late as 2302; very strong, announcing location as Jamba, Angola (Ernie Behr, Ont.) English is supposed to be on those days at 2015-2045, French at 2045-2115 (BBCM)

AUSTRALIA Once the hostages were out, Radio Australia suspended its special Mideast program at 1400-1500; however, naval personnel remained in the Gulf, and the Ministry of Defence criticized RA for not providing a message service. RA resisted doing this, to demonstrate its independence from military control, but the Senate ordered it to provide such a service, probably at the same hour (Mike Bird, RNMN)

AUSTRIA Another war casualty: *Austrian Shortwave Panorama*, one of the better media magazines, which aired Sundays at 1130 and 1430 UTC, has gone off the air due to higher priority staffing requirements to cover the Gulf war; however, unless there is lots of listener demand, it is unlikely to return after the war.

BANGLADESH Strongest signal on 60 meters at 1528 was Radio Bangladesh with news in English on 4880 (Walt Salmani, DX-peditioning on Vancouver Island) External service in English at 1230 heard on 17750 and 15647, not the announced 15200 (Tom Sundstrom, NJ, NASWA Journal) 15645 interferes with Greece on 15640 (John Babbis, MD)

BELGIUM RTBF, the external service of the French community, is closing down indefinitely, probably forever (BRT Radio World, e.s. of the Dutch community)

BOLIVIA On 4409.4 at 0120 until closing at 0335 was Radio Eco, of Cadena Radio Reyes, so perhaps formerly Radio Reyes itself on 4422; gave sked as 2200-0330 (Pedro F Arrunategui, Peru via Dario Monferini, RCI SWL Digest)

BRAZIL Radio Beijing has signed an agreement to be relayed in Spanish via Radiobras, one hour to South America, another hour to Central America (Xinhua via BBCM)

BURKINA FASO Ouagadougou heard well via long-path on 7230, sign-on varying between 0800 and 0810 (Bob Padula, Victoria, Australia, RCI SWLD)

CHINA This year's Octogenarian-on-the-Move to watch for on Radio Beijing: Chun Yen, the Politburo's central planning guru around whom the leadership is erecting a minor cult of personality, e.g. references to "Chun Yen thought." (Chuck Albertson, WA, *World of Radio*)

Heilongjiang PBS, Harbin, Program I on 4840: mainly in Standard Chinese at 0855-1420, 2055-0600; Korean at 0230-0330; Russian lessons daily 1330-1400, 2100-2130. Program II on 5950, partly in Korean: 0355-1130, 2055-2330. Nei Mongol PBS, Hohhot on 3970 and 7105-variable, at 0950-1500, and at 2140-0545 (the latter also on unconfirmed 9520, 9750), with English lessons at 1435-1450 (BBCM)

COLOMBIA CARACOL coverage of the Gulf war at 0130-0400 was heard on 3270, as well as 4865, 6075, 6150; though the third harmonic of Cucuta on 1090, tape of a previous reception mentioned 3270, so perhaps deliberate shortwave transmission (Don Moore, MI)

CONGO Brazzaville on 5985 and 4765 had news in English at 2200-2218 (Ernie Behr, Ont., RCI SWLD)

COSTA RICA Radio for Peace International now schedules our *World of Radio*: Friday 2100, Saturday 0130, 0600, 1930, Sunday 0200, 0830, 2230, Monday 0500, 2030, Tuesday 0100, 0530, 2330, Wednesday 0400, 0830. Besides direct transmissions from Switzerland, Red Cross is also on RFPI some weeks, alternating with other programs, Wednesdays around 2230, Thursdays 0300, 0730. Check 21565, 13630, 7375. RFPI's new QSL policy: reports including \$1 or 3 IRCs get a quick reply; others get a slow, eventual reply thanks to underwriting from a local sponsor.

CUBA Since Fidel was one of Saddam's few friends, Radio Havana Cuba predictably devoted much coverage to the U.S. anti-war movement; however, this is not to imply such people are comsymps (gh) Even before this, despite having to take a shortwave rather than satellite feed, C-SPAN Audio 1 started devoting two hours of prime time to RHC, at the expense of other stations such as Radio Netherlands (via Malcolm Kaufman)

RHC plans to move one of its 9 MHz transmitters to 13, and try SSB (DXers Unlimited)

ECUADOR Several stations I visited said they have great problems with the mail. One of them, Radio Centinela del Sur, Loja, has such problems with outgoing mail that they have given up answering reports (Paul Edwards, HCJB DX Partyline)

Radio Nacional Espejo, Quito, celebrating its 50th anniversary this year, has reactivated shortwave after a long absence, around 4679; listen between 2200 and 0400 (DXPL)

At least on two New Year's Eves in a row, Radio Francisco Orellana, 1030 kHz, has put out a deliberate(?) harmonic on 2059.9, heard at 0545-0610 (Don Moore, MI)

FINLAND As the war began, Radio Finland expanded broadcasts in Finnish and Swedish to the Middle East from 5-1/2 to 19 hours per day, at the expense of some parallel frequencies beamed elsewhere (BBCM)

GERMANY Deutsche Welle has been issuing specific-site QSLs for the five sites in Germany since reunification; not clear how long this will last, whether it applies to German language only, and whether external relays will also be cited (*Australian DX News*)

GREECE Voice of Greece on 17525 ex-17535 to North America at 1200-1250, 1500-1550 (John Babbis, MD, RCI SWLD)

GUATEMALA La Voz de Atitlan, 2390, is audible after Huayacocotla, Mexico closes the same frequency at 0110, until its sign-off at 0230; except UTC Mondays when the Mexican is off and Atitlan can be heard earlier (Carl Huffaker, Mexico, *SPEEDX*)

HAITI French-Creole station on 1790 at 0510-0710 at least on New Year's Eve is tentatively: Radio Trans-Artibonite, second harmonic of 895 (Don Moore, MI) Same on 1789.6 at 0636 (Paul Routenburg, Michael Bolitho, Neil Wolfish, Ont., RCI SWLD)

HONG KONG BBC relay is threatened by new airport, as would interfere with ILS before 1996; denies there is a verbal agreement with Beijing to keep the relay on (London *Sunday Times*, via RNMN)

IRAN To expand external broadcasts, three shortwave

stations will be set up in provinces of Sistan-va-Baluchestan, Khorasan and Khuzestan, by the end of a five-year plan (VIRI Tehran via BBCM)

IRAQ Radio Baghdad became more active in early January, English at 2100-2300 on 13660, including just minutes before Desert Storm began; but not since (gh) However the 0230-0430 broadcast on 11860 appeared two days later (Bruce MacGibbon, OR) Iraq quickly lost the main shortwave site, Salah el Deen; remaining transmissions accounted for by other sites (Andy Sennitt, RNMN)



RADIO BAGHDAD

Most of Radio Baghdad's efforts went into "shadowing" the psywar clandestine Voice of Free Iraq, which had started up two weeks before the war; *Saut ul-Iraq al-Hurr* used 17940, 15600 and 9568-variable at 1427-2013. Bubble-jamming tried to block them, and then Radio Baghdad programming mixed in at least on the top two; later Baghdad only dominated 17940 and 15600, as well as 15490 and 11990. The lowest VOFI frequency could be from Qatar, which had used 9570 with an identical timesignal; compare now with 9585 at 1800 (Ernie Behr, Ont.)

Radio Baghdad has been doing lots of frequency-hopping; around 2300 on 12025 (vs. VOFI), 11990 and new 8350; briefly on 9720, a Saudi frequency as well. VOFI switched to 17955. Best way to spot new Iraqi frequencies is to tune for jammers, e.g. 7585, 7220, 6876. At one point VOFI had a hilarious fake phone-in talk show with a Saddam impersonator (in Arabic) (Dave Alpert, Cyprus, monitoring for ABC News)

Iraqi services kept changing names; one was Mother of Battles Radio (*Umm-al-Maahrka*) on 17940 and 11990. VOFI announced 24-hour broadcasts, on several unheard frequencies: 15600, 17920, 9570, 15630 and 15665, mediumwave 1053 and 1167. Habitually plays Radio Baghdad news theme, but on one occasion played Radio Cairo theme instead (Hans Johnson, Maryland) Morning VOFI broadcast was at 0327-0808 (BBCM)

ISRAEL Israel Radio was compelling listening, especially as the first SCUD attacks occurred during the 0000 UTC English broadcast--punctuated by long pauses, and warnings to listeners at home to put on gas masks, go to sealed rooms; on 7465, 9435, and 11605, the latter bothered by heavy RTTY on the high side (gh) Kol Israel and IDF Radio planned to merge during emergencies, with B-network staying on 24 hours (BBCM)

Domestic service added more English at 0700 and 1345 (RNMN) Heard at 0700-0730 on 17595. Apparently all 10 SW transmitters were put into maximum capacity use, 24 hours. Arabic service, normally on 5900 and 9815 at 0400-2315, added 15100 at 0400 past 1000, 1900-2300; and 15640 at 0800-1000, with 5900 and 9815 at 1900-2315. Hebrew A-network expanded from 4 to 5 daytime channels, 0600-0800 on 11588, 13750, 15617.5, 17545, 21710; at 0600-0900 also on 15640 including French and Russian (Bob Padula, Australia)

LATVIA Radio Riga International extended English to 30 minutes, Saturdays at 1830, Sundays at 0700 on 5935; address is R.R.I., Box 266, Riga, Latvian Republic (Edwin Southwell, England, *World of Radio*) However, heard with English segments Sunday at 0805, Monday at 0740 (Kirk Allen, OK, *W.O.R.*) But quickly started 24-hour multilingual service, at least on 5935; more English at 2030, 0310 (BBCM) Radio Riga also got an English newscast on Radiostantsiya Atlantika, normally Russian-only seamen service from Leningrad, Sunday at 1305-1315 on 15330 (Alan Roe, England, *W.O.R.*)

LIBERIA ELBC, presumably controlled by Nigerian forces, heard from sign-on at 0759 on 7275 (Al Quaglieri, NY) until fade around 0820 (Kirk Allen, OK) Overrode Korea and ham QRM with national anthem at 0800, ID (gh) Also at 2200-2300, fair signal but distorted audio with Afro and pop music, English news from Nigeria

at 2255. On 9625 under CBC at 2159 interval signal sounding like ELWA; is it back on? (Ernie Behr, Ont.)

LITHUANIA The night before the Soviet attack on broadcasting facilities, Radio Vilnius predicted this, hoping it would not be their last broadcast. From the night after, only fill music could be heard at 2300-2330 on Soviet relay frequencies, 7400, 9750, 15180, 17690, 17720. Two weeks later, however, Radio Vilnius was heard again with a very critical report on what had happened, apparently not originating from their former studios (John Carson, OK) English broadcasts continued during the break, from the Kaunas transmitter on 9710 at 2230 and 2300; wanted reports via Lithuanian DX Club, P O Box 1646, Vilnius, not the "occupied" address; or telex 261143 (RNMN)



MEXICO XEUW, La U de Veracruz, nominal 6020, has been wandering; weak at 0200-0500 on 6016.25 one night; a few days later on 6016.7 (Ernie Behr, Ont.) And as low as 6012.8 at 1145, finally ID at 1302 (Bolitho, Routenburg, Wolfish, Ont.)

MOZAMBIQUE Maputo has been testing 17730 at flexible hours instead of 11819 (Richard Ginbey, Namibia, RNMN)

MYANMAR The rival National Coalition Government of the Union of Burma, at Manerplaw, HQ of the armed Karen National Union, plans to set up a shortwave station aimed at Burmese inside the country (Mae Sot, *The Nation*, Bangkok, via BBCM)

NEPAL 5005.03 had English ID at 1415; good at 1645 until closing at 1715 (Walt Salminiw, Vancouver Island, RCI *SWL Digest*)

NEW ZEALAND RNZI moved again, 17770 ex-17675 at 2111-0700 (Sundays from 0000) (Arthur Cushen, *W.O.R.*) RNZI future uncertain; Ministry of International Trade is not satisfied, having financed more than half of it; RNZ domestic service accused of using some of the money. Station became aware of numerous transmitter breakdowns only when some Pacific islander phoned (*Pacific Islands Monthly* via BRT *Radio World*)

PAKISTAN Radio Pakistan, English to Europe at 1700-1800 on new 9370, best on 11570 (Edwin Southwell, England, RCI *SWLD*)

PERU Radio Origen is new station in Huanavelica announcing 5322, heard on 5323.5 variable to 5323.6, between 2300 and 0100 (Pedro F Arrunategui & Rafael Rojas F, Lima, via Dario Monferini, RCI *SWLD*) Also new are Radio La Luz de la Vida, Cajamarca, 3194.8, at 0005-0025; and Emisora La Voz de la Esperanza, 6781.8, also Cajamarca, religious at 2335-2350. Radio Frecuencia Lider, Bambamarca now on 4419.0 at 0000-0015; and parallel 5234.8 at 0215-0230 (Arrunategui via Monferini, *ibid.*)

New on 6670 at 0130-0150 is Radio Paucarbamba, in town of same name. Radio El Puerto, Pacasmayo is again on 4300 ex-4507, around 000 (Rojas via Monferini, *ibid.*) Radio Superior, Juanjui, new on 4922, heard at 1005-1045 (Chuck Bolland, FL, *ibid.*) Radio Tarma QSL for 4775 gives schedule 1000-1400, 2000-0500 weekdays, 1100-0500 Sundays (Yimber Humberto Gaviria, Colombia, *ibid.*)

DX Helper

Macintosh Software W71-R

MUF Map • MUF Plot

Gray Line • Great Circle

Prefix, Zone, Oblast

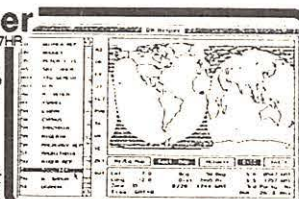
WWW Alert • CW Drill

\$39.95 Info
ppd S1

Antennas West

Box 50062-M, Provo, UT 84605

(801) 373-8425



See band openings on the map before they happen!

Shortwave Broadcasting

SOMALIA Rebel victory over previous regime no doubt affects Mogadishu and Hargeisa broadcasts. Radio SNM, the Somali National Movement station, was previously observed around 1600 on different frequencies one day to the next: 6525, 6330, 6305, 6303 (BBCM)

SOUTH AFRICA Radio RSA programs, sometime during the following hour: *African Tapestry*, Wed. 1600, Thu. 0400, Fri. 1500, Sun. 1700. *Clinic of the Air*, Mon. 0400, 1600. *Down Our Way* (entertainment scene), Sat. 1500. *Let's Speak English* (ESL), Wed. 0400, Thu. 1600, Sun. 1100. *Our Wild Heritage & Earth Rise Africa*, Tue. 1600, Thu. 1500, Fri. 0400, Sat. 1600, Sun. 1500, 1700. *P O Box 91313*, Sat. 1100, 1500, 1700. *Science & Technology*, Sun. 1100, 1600. *Sport RSA*, Mon. 1100, 1700. *Touring RSA*, Sat. 1300, Sun. 1100, 1700. *Women in Africa*, Mon. 1500, Tue. 0400, Fri. 1600. *Yours and Mine* (greetings and requests), daily except Sat. 1600 (via John Carson, OK)

SPAIN Radio Exterior started a new service in Spanish to Equatorial Guinea, 1600-1800 on 17890 (BBCM)

SRI LANKA Deutsche Welle reactivated Trincomalee relay again: English 0900-0950 on 17820, 11740; other languages 0700-1000 21640, 1000-1400 15350, 1200-1320 15185, 9535, 1330-1420 15360 (Peter Senger, DW, via ADXN)

Radio Japan's new Ekala relay: English 0100-0200 11840, 1400-1500 9535, 1600-1700 15210; other languages: 0200-0330 11840, 0330-0500 17820, 1300-1500 9535, 1530-1700 9535, 1700-1800 and 1930-2000 on 15210 (BBCM)

As soon as the war started, Mideast transmissions were expanded: English 0100-0200 on 15210, 0500-0600 on 17820, 2100-2200 & 2300-2400 on 15210; other languages 0000-0100 15210, 0600-0700 17820, 1200-1230 17820, 2000-2100 & 2200-2300 15210 (Radio Japan DX Corner)

SWITZERLAND SRI announced new Middle East transmission on 9650, 0310-0530 (RCI SWLD)

TANZANIA Due to breakdown of equipment, Radio Tanzania's two services merged in April 1989; now with two new 100 kW transmitters they have separated: National Service 0430-2100 on 5050 and 4785 (9685 to be repaired later); Commercial Service 0900-2100 on 6105; still mixed at 0200-0430 (BBCM) National Service high power in Swahili on 7165 at 2030-2100, some days on 6105 instead (Bob Padula, Victoria, Australia)

TURKEY Voice of Turkey, 2300-2350 on 9445, had extensive Gulf war reports including three different newscasts, press reviews (Bill Dvorak, WI, *World of Radio*) Very detailed, including regular feature "What World Radios Say About the Gulf War" quoting BBC, DW, RFI, Amman, Israel, Iran, etc. (Paul Brouillette, IL, *W.O.R.*)

UNITED ARAB EMIRATES UAE Radio, Dubai, best on 11945 for English news at 0330, matter-of-factly reporting all news on the Gulf war, unlike in August when Saddam apparently intimidated them into not even mentioning the Kuwait invasion for about three days! (Paul Brouillette, IL, *W.O.R.*) Saudi TV took four days to report it (CBC *Sunday Morning*)

Voice of the UAE, Abu Dhabi, has been carrying Radio Kuwait programs /in Arabic/ at 2230 on Fridays, Sundays, Tuesdays (BBCM)

UKOGBANI Just before the Gulf War began, BFBS announced it was dropping the 0150 to 0230 shortwave broadcast due to FM in Saudi Arabia; after the war began, the 1330-1400 show on 15390 17695 21735 finally became mostly news instead of mostly music. The war



also led BBC to disrupt its programming extensively, despite careful planning months in advance, inserting news headlines several times an hour, expanding regular news programmes, pre-empting or retiming other features (gh)

USA CBC Radio far outdid CBS TV in speed and detail of reporting the outbreak of war. BBC and VOA-Spanish also went immediately into nonstop coverage, but what about VOA-English? Incredibly, it stayed with regular programming until Bush's speech at 0200. Will VOA offer us an explanation? (Don Moore, MI) Administration mouthpiece ...

World of Radio is now much more timely, produced the day before first airing on WWCR, Fridays at 2215 on 15690; repeated UTC Sundays (temporarily?) and Mondays at 0130 on 7435 replacing 7520 to escape KTNB on 7510. Times expected to shift one UTC hour earlier at beginning of April, but same frequencies. WWCR has also been authorized 12160 and 17525 for its second transmitter, also beamed toward Europe, on air by mid-year.

Eternal Word TV Network plans one shortwave site in Birmingham, Alabama with three transmitters; one in Rome, Italy with two; and one somewhere on the Pacific Rim; US and Italy active by 1993, Pacific by 1994. Heading newly-established SW engineering department is Bob German, formerly of WSHB (Tom Sundstrom, *NASWA Journal*) Why another Catholic station in, of all places, Rome? EWTN has doctrinal differences with the Pope (Ken MacHarg)

USSR Radio Moscow cut back many language services, and regional English services. Absorbed into the World Service are the British service at 2000-2100, African services at 0630, 1630 and 1930; North American 2300-0100, 0200-0400. Separate Western North American continues at 0400-0800, and a new French service to North America is at 0300-0500 (BBCM) At 2300 we hear IDs only as "Radio Moscow," evading the question of whether it's World or North American; apparently except for 0400-0800, there is no longer any separate World Service running when regional services are on (gh)

Radio Station Peace & Progress is new at 0130-2000 on 9750, 7400 and others announced, presumably for North America (BBCM)

Tyumen Oblast Radio is on 4895 at 0000-2000. Khanty-Mansiysk Okrug Radio uses 4820 at the same times, including relays of Tyumen weekdays at 0115-0130, 0200-0300, daily 1255-1310, Sunday-Friday 1310-1400 (BBCM)

Changing times in the USSR! Yakutsk Radio, 4800, listed for Moscow-1 program heard at 1545-1610 in Russian with religious programs and announcements from KNLS, Alaska, and LeSea's WHRI! (Guy Atkins, WA, *Fine Tuning*)

UZBEKISTAN Radio Vatandosh heard at 0230-0300 in Central Asian language, maybe Uzbek from Tashkent, on 11765 and 11975 (Ernie Behr, Ont., *DX Listening Digest*)

VENEZUELA Radio Continental, 4940 at 0545 in English inviting reception reports (Sheldon Harvey, PQ, *CIDX Messenger*) Station also asked a Japanese listener to tape ID in that language (*Radio Nuevo Mundo*)

VIETNAM Lai Chau heard at 1200-1330 weakly on new 6225, ex-6253; local language until 1300, then Vietnamese (Isao Ugusa, Japan, Radio Japan DX Corner)



Keep up with the latest by monitoring Glenn Hauser's broadcasts on WWCR, WRNO, RFPI Costa Rica, and Radio Canada International; and reading his magazines *DX LISTENING DIGEST* and *REVIEW OF INTERNATIONAL BROADCASTING*. Samples in North America \$2 each from Box 1684-MT, Enid, OK 73702.

Broadcast Loggings

Thanks to our contributors -- Have you sent in YOUR logs?
Send to **Gayle Van Horn**, c/o Monitoring Times.
English broadcast unless otherwise noted.

0003 UTC on 15115

NORTH KOREA: Radio Pyongyang. Editorial on the United States and chat on South Korean peasants. More programming on the "Socialist Works of the USA." Monitored to 0030 UTC. (Bailey, AR) Audible on 15340 kHz at 0657 UTC. (Carson, OK)

0030 UTC on 9630

SPAIN: Spanish Foreign Radio. Press Review on politics and the housing market. Parallel frequency 11880 kHz heard. (Fraser, MA)

0053 UTC on 17690

USSR: Radio Kiev. Closing program IDs, frequency schedules and Ukrainian language program. (Carson, OK)

0102 UTC on 11800

ITALY: RAI. News coverage on the Middle East. Audible on parallel frequency 9575 kHz. (Fraser, MA) (Cavanaugh, LA)

0200 UTC on 5975

UNITED KINGDOM: BBC. International news coverage of German, USSR, USA, followed by "World of Music" show. Programming monitored to 0230 UTC with excellent signal quality. (Bailey, AR)

0212 UTC on 11745

VATICAN STATE: Vatican Radio. Spanish. Interval signal and bells at tune-in. Talk on South American missionaries' work. (Carson, OK)

0300 UTC on 5930

CZECHOSLOVAKIA: Radio Prague International. National news and economic report. (Landau, NJ) (Wright, MS) Monitored from 0400-0415 sign-off. (Bailey, AR) (Carson, OK) (Law, LA)

0302 UTC on 9965

GUATEMALA: Radio Calman. Spanish. Rock music to station ID and political speech. (Carson, OK) (Law, LA)

0315 UTC on 4915.5

PERU: Radio Cora. Spanish. Older Latin American tunes until station ID at 0330 UTC. Brief comments to music selections. (Witham, HI)

0330 UTC on 13675

UNITED ARAB EMIRATES: UAE Radio-Dubai. National news and readings from Islamic literature. Monitored on 21605 kHz at 1329 UTC. (Carson, OK) (Bagwell, MO) (Law, LA) (Johnson, VA)

0400 UTC on 9445

TURKEY: Voice of Turkey. Frequency schedule, national news, Turkish press reviews. Good signal quality to tune-out at 0430 UTC. (Bailey, AR) Monitored at 2303 UTC on 9445 kHz. (Landau, NJ) (Wilson, IN) (Cunningham, PA)

0607 UTC on 9765

MALTA: Voice of the Mediterranean. Listeners' letters and instrumental opera selections. (Carson, OK) (Bagwell, MO)

0615 UTC on 4990.9

PERU: Radio Ancash. Spanish. Beautiful Peruvian instrumentals. Occasional chat from announcer including an ID and time check. (Davis, AL) (Law, LA)

0637 UTC on 9675

POLAND: Radio Polonia. "Focus" program discusses film awards and interview with a Polish painter. Polish service commences at 0700 UTC. (Carson, OK) (Wright, MS) (Wilson, IN)

0730 UTC on 9535

SWITZERLAND: Swiss Radio International. National and world newscast, followed by "Grapevine" program. Station ID/frequency schedule to sign-off at 0800 UTC. Audible on 12035/9885 kHz at 0203 UTC. (Bailey, AR) (Landau, NJ) (Davis, AL) (Wright, MS)

0815 UTC on 3930

REP. OF KOREA: Korean Broadcasting Service. Korean. DJ format with call-ins and Korean music. Weak signal with fading. (Witham, HI)

0825 UTC on 9645

BRAZIL: Radio Bandeirantes. Portuguese. Easy Brazilian station to work with plenty of ads, musical jingles, Braz pops, IDs and lively DJ chatter. Parallel frequency 6090 and 11925 audible, however, somewhat weaker. (Davis, AL)

0835 UTC on 4050 USB

USSR: Radio Tihy Okean. Russian. Excerpts from political speeches with studio commentary, Russian pop music at 0842 UTC. (Witham, HI)

0850 UTC on 3355

PAPUA NEW GUINEA: (New Guinea) Radio Simbu. Pidgin. Island music to New Guinea/Pacific news coverage at 0900 UTC. Continued news from New Zealand and BBC relays. (Witham, HI)

0950 UTC on 3310.3

BOLIVIA: Radio San Miguel. Spanish. Fair/poor signal quality for local Bolivian music, and announcer chat to time check. Station ID and more talk. A real tough one to copy. (Wright, MS)

1110 UTC on 9595

JAPAN: Radio Tanpa. Music instrumentals to station ID, fair signal quality with fading. Parallel frequency 6055 fair also. (Westbrook, OH) (Wilson, IN)

1113 UTC on 6075

UNITED STATES: Voice of America. "Focus" program featuring talks on sulfur dioxide pollution, and planned programs to reduce the effects of chemicals on the environment. (Young, MA) (Williams, NH)

1120 UTC on 11815

NETHERLANDS ANTILLES-Bonaire: Trans World Radio. Discussion from family counselor Jay Koessler, dealing with how a mother dealt with her daughter's transgressions. (Young, MA) (Carson, OK)

1130 UTC on 6030

UNITED STATES: Radio Marti. Spanish. Program of North American and Latin American easy-listening music. National news at 1200 UTC. (Fraser, MA) (Cunningham, PA)

1150 UTC on 9560

CANADA: Radio Korea relay. "From Us To You" mailbag program. (Fraser, MA) (Davis, AL) (Wright, MS) (Law, LA) (Cunningham, PA)

1150 UTC on 6120

CANADA: Radio Japan relay. Report on proposed land holding tax that is opposed by big business. (Fraser, MA) (Bagwell, MO)

1200 UTC on 6185

MEXICO: Radio Mil. Sign-on and national anthem. Station ID/frequency quote. Mexican pops and ranchera tunes to chat and ad jingles. (Jaffee, KY) (Westbrook, OH)

1220 UTC on 5023

BHUTAN: Bhutan Broadcasting Service (tentative). Very weak signal of man speaking, followed by equally weak Asian/subcontinental music. Signal lasted only 10 minutes till fade-out, but an interesting log. (Westbrook, OH)

1245 UTC on 7165.3

NEPAL: Radio Nepal (tentative). Fair signal during Asian vocal music. Weak carrier on parallel frequency 5005 kHz. Talk from announcer but no discernable ID. (Westbrook, OH)

1400 UTC on 21705

NORWAY: Radio Norway. English sign-on ID into Norwegian program with news. Monitored on 11850 kHz at 2058 to interval signal and "Norway Today" show. (Carson, OK) (Westbrook, OH) (Law, LA) (Johnson, VA)

1550 UTC on 3260

CHINA: Guizhou Peoples' Broadcasting Service. Chinese. Western and Latin American music, with brief music titles. Announcements to station sign-off at 1600 UTC. (Witham, HI)

1600 UTC on 17595

MOROCCO: Radiodiffusion Television Marocaine. Last bits of American rock music, followed by newscast. ID noted as, "This is the international service of RTM Ribat." Station sign-off at 1700 UTC. (Price, PA)

1640 UTC on 3662.5

PAKISTAN: Azad Kashmir Radio. Announcer duo chat in unidentified language until 1650 UTC. Indian style music until time-tips and news at 1700 UTC. Several mentions of "Kashmir" at 1705 UTC. (Witham, HI)

1830 UTC on 21685

NETHERLANDS: Radio Netherlands. "Happy Station" program with listener's contest discussion. Audible on parallel 17605 kHz. (Fraser, MA) (Carson, OK) (Johnson, VA) (Williams, NH)

1930 UTC on 9720

SRI LANKA: Sri Lanka Broadcasting Service. Announced as "Sri Lanka World Service." Mailbag program with several IDs until 1945 UTC. Audible on parallel frequency 15120 kHz. (Witham, HI)

1945 UTC on 9700

BULGARIA: Radio Sofia. Report on Bulgaria's coinage, especially commemorative coins issued. (Fraser, MA) Audible on 7115/11720 at 0400 UTC. (Carson, OK) (Law, LA) (Bagwell, MO)

2030 UTC on 9410

UNITED KINGDOM: BBC. "Brain of Britain" quiz show, also on parallel 12095 kHz. (Fraser, MA) (Carson, OK) (Bailey, AR) (Williams, NH) 2100 UTC on 6280

2100 UTC on 6280

LEBANON: King of Hope. Station ID/frequency schedule to Israeli address. "House of Prayers" program to ID at 2113 UTC as, "This is Operation Desert Hope." Good signal quality. Monitored Voice of Lebanon in Arabic, at 2115 UTC on 6549.4, with improved signal quality by 2130 UTC. (Price, PA)

2100 UTC on 4850

CAMEROON: CRTV-Yaounde. English newscast from 2100-2119 UTC. Sports report and national news of Cameroon. (Price, PA) (Law, LA)

2155 UTC on 5003.3

EQUATORIAL GUINEA: Radio Nacional. Spanish. Station ID as, "Radio Nacional de Guinea Ecuatorial Bata." Several tunes of African rhythms and "Bata" IDs. Excellent signal and modulation. (Price, PA)

2220 UTC on 9900

EGYPT: Radio Cairo. Travelogue show on a tour of Giza. (Fraser, MA) Monitored at 0201 UTC on 9475 kHz. (Carson, OK) (Cavanaugh, LA)

2230 UTC on 9115 USB

ARGENTINA: Radio Continental. Spanish. "Continental" ID at tune-in with accompanying fanfare. Announcer chat and ad jingles to easy-listening music. (Hetherington, NC) (Cunningham, PA)

2240 UTC on 9720

CLANDESTINE: Holy Mecca Radio. Arabic. Interference during Koran recitations. Some talk and ID, with sign-off at 2300 following march music. (Bagwell, MO)

2315 UTC on 17700

USSR: Radio Moscow. Program "Moscow Mailbag," and comments on Iraq. (Norman, OK) (Rickabaugh, CT)

2325 UTC on 4815

BRAZIL: Radio Londrina. Portuguese. Brazilian pops at tune-in. Station ID mentioning city Londrina and time check. Announcer chat to local news bits. (Wright, MS)

Utility World

Larry Van Horn

c/o MT, P.O. Box 98
Brasstown, NC 28902

It's a strange, strange and weird world of beeps, blips and other assorted noises. The Utility World radio spectrum is loaded with all kinds of strange radio noises and signals. To the newcomer or shortwave listener just tuning around the utility bands for the first time, you will experience a speaker loaded with audio mysteries.

One of those strange noises you will encounter frequently in the utility bands is the sound of stations sending facsimile, or FAX. A FAX station sends pictures, charts or other visual images that are recorded on paper from one location to another by means of electronic signals. Once you have heard what a FAX station sounds like, it will be quite easy to spot other FAX stations in the shortwave spectrum.

At the transmitting site, each pixel (spot) of the picture is sampled by an optical sensor for intensity (light or dark). The intensity is then converted into an electronic signal proportional to the lightness or darkness of the image. Each pixel of the picture is scanned horizontally by the optical sensor forming lines. Once one horizontal line has been scanned, the optic sensor moves to the next row and continues the process until the whole picture has been scanned.

In the early days of FAX transmission, this process was accomplished by placing the picture on a rotating drum. The optical sensor would move along the axis of the drum at a much slower speed converting the picture to electronic signals. This was how the term, drum speed, or FAX speed, came into use. It is important when receiving a FAX signal that the proper speed be set to receive the transmitted image.

Of course, with proper equipment, the receiving station can take the transmitted signal, demodulate it, and produce a copy of the original picture or chart. For the most part today, the old drum and optic sensor process has been replaced by pure electronic scanning methods, but the electronic signature and methods of sending and receiving FAX signals are basically the same.

In the utility bands, FAX signals are FM (frequency modulated). The tone transmitted corresponds to the electrical voltage (lightness/darkness) of each pixel. On weather satellite downlinks, AM (amplitude modulated) signals are used to send weather satellite pictures. In this case, the tone of the frequency remains constant but the amplitude (loudness) corresponds to the lightness/darkness of the images being transmitted.

A lot of the FAX you will receive in the shortwave spectrum will be weather products (charts, maps and satellite pictures). The FAX speed for these products are usually 120 lines per minute (LPM). The Soviet block weather systems use 90 LPM, which is sometime useful as a means of identification.

A 120 LPM FAX signal will have two tones transmitted every second. Remember that the frequency of the one determines the amount of lightness/darkness of the picture being transmitted. A typical weather chart or map will take about 13 to 15 minutes to receive. The quality and clarity of a FAX image depends on how well the FAX station is being received. Noise and fading will show up on your received image as lines and loss of detail. If the station is transmitting a 120 LPM picture, every half second of interference will wipe out one full line of FAX image.

Another product occasionally seen on shortwave is press photos. The biggest user here appears to be the Associated

Press out of Argentina. These folks use 60 LPM drum speeds. Some real interesting photos have been received over the years on shortwave radio.

There are a few other specifications that FAX folks use to classify FAX signals. These include:

The Index of Cooperation (I.O.C.) determines the relationship between the width of the image and the number of lines per inch that make up the image. In short, the I.O.C. is the picture's ratio of height vs. width. In the world of shortwave radio FAX reception, we commonly deal with two I.O.C.s. For press services 288 is normally used. The most common I.O.C. you will encounter is 576 used by most weather stations.

The direction that the image is being scanned is another important specification. Most images are transmitted "left to right." The exception is that some press photos are sent "right to left." You can normally control this with your receiving equipment.

And finally, polarity (black on white, white on black) represents positive and negative polarity respectively. Press photos are normally sent with negative polarity. Again, most FAX demodulators allow you to change polarity to fit the imaging being received.

By now you should have a basic understanding of FAX principles, but you are probably saying to yourself, "What does a FAX signal sound like and how do I recognize them?"

It is really simple, folks. Go to your receiver right now, put it in the upper sideband (USB) or turn on your BFO. Now tune up to one of the following frequencies (lower frequencies at night, higher in the daytime): 3357, 8080, 10865, 16410, 20015. If all you hear is a tone, wait a few minutes. I guarantee after a short period of time you will hear the ratcheting sound of a FAX signal.

Make a mental note of the signal you hear. The frequencies I have listed above belong to the U.S. Navy station NAM at Norfolk, VA. They can be heard almost 24 hours a day on at least one of the frequencies I have listed above sending weather charts and satellite pictures.

Now that you have gotten this far, maybe you would like to decode the signals to see what is being sent. For this you will need a demodulator. These come in many different varieties and price ranges. A good starting point is to check in with some of our advertisers here in MT that carry FAX demodulators, like Universal Radio and Grove Enterprises. They will be more than happy to provide you with information on their products.

Some of these multi-purpose units will also let you decode other digital type broadcasts like RTTY, ASCII, Packet Radio signals, etc. They represent a real nice addition to your radio shack and open up new areas in the Utility World spectrum for you to explore.

Now let's run a list of a few meteorology FAX station frequencies so you can have some other targets to shoot for.

Utility World Meteo FAX Frequency Guide

Rota, Spain (USN)	AOK	4704, 5785, 9050, 9382.5, 9875, 17040, 17585
Delhi, India	ATA	4993.5, 7403, 14842, 18255
Darwin, Australia	AXL	5755(32), 7535(33), 10555(34), 15615(35), 18060(37)
Melbourne, Australia	AXM	2628(31), 5100(32), 11030(34), 13920(35), 19690(37)

Beijing, China	BAF	5527, 8122, 10117, 14367, 16025, 18237
Valparaiso, Chile	CBV	4228, 8677, 17144.4
Santiago, Chile (Navy)	CCS	4766, 6418, 8594, 13525, 22071
Halifax, NS Canada	CFH	122.5, 4271, 6330, 10536, 13510
Esquimalt, BC Canada	CKN	4266.1, 6454.1, 12751.1
Hamburg, Germany	DDK	3855, 7880, 13882.5
Madrid, Spain	ECA	3650, 6918.5, 10142, 10250
Bracknell, England	GFA	3289.5, 4610, 8040, 11086.5, 14582.5
	GFE	2618.5, 4782, 9203, 14436, 18261
London, England (Navy)	GZZ/YA	2813.6, 3436.6, 4247.6, 6436.6, 8334, 8494.6, 12741.6, 16115, 16938.6
Jeddah, Saudi Arabia	HZN	3560, 5452, 10296
Rome, Italy	IMB	4777.5, 8146.6, 13597.4
Tokyo, Japan	JMH	3622.5, 7305, 9970, 13597, 18220, 23522.9
	JMJ	3365, 5405, 9438, 14692.5, 18441.2
Honolulu, HI	KVM70	9982.5, 11090, 16135, 23331.5
Lewes, CA	KWX	4223
Buenos Aires, Argentina	LR...	5185(069), 10720(B72), 18093(084)
Norfolk, VA (USN)	NAM	3357, 8080, 10865, 16410, 20015
Totsuka, Japan (USN)	NDT	4965, 12777, 22324.5
Kato Soli, Greece (USN)	NGR	4053.5, 7453, 8506, 9255, 12040, 12759
Diego Garcia (USN)	NKW	7580, 12804, 20300
San Francisco, CA (CG)	NMC	4344.1, 8680.1, 12728.1, 17149.3, 22527
Boston, MA (CG)	NMF	3242.5, 7530
Kodiak, AK (CG)	NOJ	4298, 8459
San Francisco, CA (USN)	NPJ	9090
Pearl Harbor, HI (USN)	NPM	2122, 4855, 9398, 14828, 21839
Apra Harbor, Guam (USN)	NPN	5260, 10255, 16029.6, 19860, 23010
Adak, AK (USN)	NUD	8494
H.C. Holt, Australia	NWC	8614, 12727.5, 16914.5
Copenhagen, Denmark	OXT	5850, 9360, 13855, 17510
Moscow, USSR	R..	144.5, 2815, 3875, 4202.5, 5150, 5355, 6880, 7670, 7750, 10230, 10710, 10980, 11525, 12165, 13470, 15950, 18710
Novosibirsk, USSR	R..	3635, 4445, 4475, 5335, 5765, 9060, 9220, 12230, 12320
Tashkent, USSR	R..	3280, 3690, 4365, 5285, 5890, 7570, 8083, 9150, 9340, 13947, 14982.5
Khabarovsk, USSR	RXO	4516.7, 7474, 9230, 14737, 19275
Cairo, Egypt	SUU	4526, 10123
Mobile, AL	WLO	6852, 9157.5
Auckland, New Zealand	ZKLF	5807, 9459, 13550, 16340.1
Pretoria, South Africa	ZRO	4014, 7508, 13538, 18238
Nairobi, Kenya	5YE	9045, 12317, 15527, 16317, 17367, 22869

Finally, here is a list of just a few of the channels I have observed press photo activity on. You might want to try: 5768, 5878, 6872, 8467, 8617, 10677, 13454, 13751, 17069, 17670, 18413, 18431, 20736, 22542

I would like to thank Jacques d'Avignon, Art Blair, Lt. Arnel Cook, Hal Bilodeau, Tom Sundstrom and LCDR T.E. Bosse for providing information on FAX stations and schedules presented above.

Monitoring the Corps

Bill Frantz recently did some monitoring of the Army Corps of Engineers HF radio system. Between 1230-1450 UTC on 6785, Bill heard the following stations:

- WUC 56 Melbourne, FL
- WUC 5 Jacksonville, FL
- WUC 52 Palatka, FL
- WUC 60 (no location mentioned)
- WUC 55 (no location mentioned)
- WUC 521 Canaveral Locks, FL

The stations were apparently practicing and participating in damage control communications. All stations discussed downed trees, blocked roads, no power, running on emergency power, etc. Sounded real enough to Bill. Bill also stated that some of the damage was reported in the Tampa/St. Petersburg area.

For Bill's information and the rest of our readers, 6785 kHz is one of the Army Corps of Engineers HF Disaster frequencies. During the exercise, Bill also noted station WUC

55 asking the other stations in the net to try the following channels:

- Channel 3 6020 kHz
- Channel 4 6785 kHz
- Channel 8 12070 kHz
- Channel 12 16382 kHz

5327 was also used and there was some discussion as to whether this was channel 2 or 3. One station said he thought it was channel 4. WUC 55 also informed the group that channels 5, 6, and 11 had been deleted from authorized use.

Not all stations in the net, however, could access all frequencies. Only those stations with the "Kenwoods" could operate on all frequencies. Other stations were using "old Motorolas."

The next day, Bill also heard "Emergency Area Office calling AEBU-Sable" with no response. AEBU Sable is a Corps of Engineers ship.

Bill also gave us another frequency to watch: 7788.5. He has only heard brief messages here, and several weeks ago the stations on this frequency were using FM. Most of the comms were using upper sideband. Bill also says you shouldn't confuse this with 7778.5, as he first did. The most recent identifiers are P5 and U5. Operations are generally around 1300 to 1500 UTC.

New SAC Channel

Jeffrey Stafford up Illinois way thinks he might have found a new SAC (Strategic Air Command) frequency, 6969 kHz. He was listening to the primary night time SAC channel, 6761, when Norse 31, a B-52 in contact with Grand Slam directed him to go to 6969 lower sideband for further communications. Jeff believes they were trying to arrange a rendezvous near Grand Junction, Colorado, with another bomber, Norse 06.

There was apparently some difficulty making the rendezvous if Norse 31 refueled as per schedule (0055 UTC). Several references were made to making entry at certain times, probably meaning entry into the refueling track.

"I listen to SAC a great deal," says Jeff. "I listen primarily between 0000 and 0500 UTC. Could you explain a little more about SAC operations? There seems to be a number of patterns, such as an aircraft calling Skybird, which then answers with a call sign that changes at least daily. Often, I hear aircraft calling 'Skyking, Skyking, do not answer,' followed by a coded message. Any way to tell where these are directed?"

Skybird and Skyking are static general SAC call signs, Jeff. Their usage is as follows:

- Skybird: General net air/ground call sign used by an aircraft wishing to contact any SAC ground station.
- Skyking: General net air/ground call sign used by ground stations wishing to send traffic to all nuclear forces and support groups.

Finally, a special note to you all. I have recently learned as of this writing that long time friend and shipmate Mike Hardester HM1 is in Saudi Arabia with the Marines. Mike, I am sure that I speak for all of the readers and staff of MT, and my family in wishing you godspeed home and may you remain safe from harm. Also, keep Sgt. Neal Perdue, MT Ute World reporter's son in your prayers, as well as all others near and dear in the Gulf. Our prayers are with you and "Fair winds and following seas."

Now it is time to see what the rest of you are hearing this month from the world of utility frequencies. 'Til next month . . . best of listening to all.

Utility Loggings

Abbreviations used in this column

All times UTC, frequencies in kilohertz. All voice transmissions are English unless otherwise noted.

AM	Amplitude modulation	ISB	Independent sideband
ARQ	SITOR	LSB	Lower sideband
CW	Morse code	RTTY	Radio teletype
FAX	Facsimile	UNID	Unidentified
FEC	Forward error correction	USB	Upper sideband
ID	Identification	NDB	Nondirectional beacon

- 274.0 DLC-Dillon, South Carolina, NDB at 2110. (Hardester, NC)
- 281.0 IL-Wilmington, North Carolina, NDB at 2125. (Hardester, NC)
- 328.0 CH-Charleston, South Carolina, NDB at 0715. Listed as 329 but solidly here. (Hardester, NC)
- 338.0 LM-St. Louis, Missouri, NDB at 0732. (Hardester, NC)
- 338.0 POB-Ft. Bragg, North Carolina, NDB at 0725. (Hardester, NC)
- 379.0 ACZ?-Wallace, North Carolina, NDB at 2125. Believe the one mis-keying. ID sounds like all letters run together. Heard day/night here. (Hardester, NC)
- 380.0 PNZ-Unid NDB heard at 0749. Occasional broken keying. (Hardester, NC)
- 394.0 YX-Unid NDB station at 0756. (Hardester, NC)
- 401.0 IS-Kinston, North Carolina, NDB heard at 2135. (Hardester, NC)
- 404.0 OUC-Ocracoke Island, North Carolina, NDB heard at 2141. (Hardester, NC)
- 428.0 COG-Orange, Virginia, NDB at 0810. (Hardester, NC)
- 432.0 IZN-Lincolnton, North Carolina, NDB at 0820. (Hardester, NC)
- 518.0 NAVTEX broadcast from unid station at 1600, 2200, 0400 UTC. Can't figure call sign or location of transmitter. Using FEC mode. Any ideas? (Ed Flynn, San Rafael, CA) *Ed, I think this is coming out of NMC. I can't seem to find my NAVTEX notes right now. One of these days I am going to get organized. Of course, I told Gayle that now for 15 years-Larry.*
- 521.0 GM-Greenville, South Carolina, NDB heard at 0825. (Hardester, NC)
- 526.0 CYV-Camp Blanding AAF, Florida, NDB heard at 0827. (Hardester, NC)
- 2069.0 Noted in USB several USN units on net with radar ops. Used familiar USN terms (i.e. NUCO, playground, etc) at 0540 in USB. (Fernandez, MA)
- 2586.2 IX4 calling B8Q with radio check from Radio User's Manual. Heard at 0910 in USB, then went green. Seemed like some sort of training net. (Burke, AZ)
- 2716.0 USS Frank Cable (AS-40) and USS Fulton (AS-11) working QHM Halifax at 0521 in USB. Baldy or Bald Eagle control 2 calling McMurdo Control, Antarctica at 0932 in USB. (Burke, AZ) *Nice catch, Scott-Larry.*
- 3037.0 Same bunch of stations noted here as one 2069 (see previous-Larry) at 0605. Looks like a USN net. (Fernandez, MA)
- 3060.0 YB/KW with tactical ops and an occasional EAM BC by other stations at 0613 in USB. (Fernandez, MA)
- 3067.0 In USB noted a male ending a EAM broadcast. ID not copied due to static crash at 0618. (Fernandez, MA)
- 3087.0 Yard Bird through McClellan GCCS to SAC CP at Hickam at 1134 in USB. (Brinkley, CA)
- 3253.0 2 unid USCG units in conversation using scramblers at 0144 in USB. (Fernandez, MA)
- 3307.0 Lima Mike, Echo Foxtrot working Playground, using Carrot, Tomato, Corn and Cabbage as IDs at 0715 in USB. (Burke, AZ) *It's veggie time-Larry.*
- 3456.7 Shrimp fishing boats off New England, engaged in casual conversation peppered with foul language in USB at 0220. (Bilodeau, IL)
- 4125.0 VAI-Vancouver, British Columbia, Canada, with tail end of weather report and ID as Vancouver Coast Guard Radio at 0200 in USB. (Perdue, AL)
- 4369.8 WLC-Rodgers City, Michigan, in contact with the Anderson, Sloan and Kelsy which was docked at East Chicago, Indiana, exchanging weather reports in USB at 0404. (Bilodeau, IL)
- 4373.0 USN FACSAC-VACAPES area in USB, many L#L call signs on net with off-shore radar tracking ops at 0153 in USB. (Fernandez, MA)
- 4400.0 USCG District 8 Operations working aircraft Rescue 2119 with phone patch after being shifted here by COMSTA New Orleans, Louisiana, on 5696. Not to be confused with USCG frequency 4400.8. Heard at 2349 in USB. (Perdue, AL)
- 4462.0 Two men discussing fishing conditions, tuna industry, effects of hurricanes on conditions in Atlantic. Used first names, no call signs at 0654 in USB. (Miles, NY)
- 4638.0 KFC 699 working several units in LSB at 0302. One had a very strong signal. Could they have been trucks, Larry? (Hill, MI) No, Russ, KFC 699 is in Houston and they take oil rig status reports from off-shore oil rigs-Larry.
- 4700.0 Several stations using scramblers noted here at 0158. (Fernandez, MA)
- 4746.0 SENTRY 46 working Lajes AFB, Azores, at 0026 in USB. Also tried 9270 and 11150. (Battles, NH)
- 5186.0 Lotsa comms in the green also heard NCCT-1 calling unid station at 0500 in USB. (Burke, AZ)
- 5289.0 Wargames? Echo Whiskey giving coordinates to Kilo/India/Romeo/Mike/Victor and Wichita 107 in pursuit of potential hostile. Mike with guns out made three challenges. IDed aircraft as a C-130 nonplayer. Also mentioned was Juliet Control, Bugs Bunny Station, Nimitz aircraft. At 0340 in USB. (Harwood, CA) *Sounds like one of mine, Skip-Larry.*
- 5320.0 USCG-Fort Macon, North Carolina, working USCGC Point Warde WPB-82368 in USB at 0111. (Hill, MI)
- 5555.5 Unid fishing boat and apparently a fishing company shore station. American English spoken, no southern accent. Boat skipper told of day's catch and supplies needed. Sounded like a legit operation but on a weird frequency. Heard at 0146 in USB. (Perdue, AL) *Probably not legit, no call signs and they (illegal fishing ops) are showing up all over the spectrum-Larry.*
- 5566.0 A lot of USCG comms activity noted on this frequency at various times in USB. (Fernandez, MA)
- 5696.0 NOQ-USCG AIRSTA Mobile, Alabama, working aircraft Papa 8 Kilo and IDed as Mobile Air at 0156 in USB. Close to me but seldom heard as COMSTA New Orleans usually handles the guard for aircraft in this area. Also heard India 8 Zulu Tac 1 working NMF USCG COMSTA Boston then shifting to 3-Echo-4 frequency at 0214 in USB. NOS-USCG AIRSTA Cape Cod, Massachusetts working aircraft 1493, taking info on location of fishing boat disabled with crew ready to abandon ship, at 2340 in USB. (Perdue, AL)
- CAMSPAC San Francisco working Rescue 1702 enroute a tanker taking on water in the engine room. Heard at 0641 in USB. (Mullowney, TX)
- 5762.0 Spanish female five-digit number station at 0400. (Harwood, CA)
- 5772.0 Spanish female five-digit number station at 0810. (Harwood, CA)
- 5775.0 Derang calling Humble, asked to switch to Sierra 2. (Harwood, CA) *That's a weird one, Sarge-Larry.*
- 6200.0 NMOM-USS Engage (MSO-433) Navy ocean minesweeper out of Miami working NMA COMSTA Miami with operations report, duplex 6506.4 at 0124 in USB. (Perdue, AL)
- 6215.5 Yacht Southbound II at anchor in Hamilton, Bermuda, working many yachts and pleasure boats in the Atlantic and Caribbean giving weather information from Chinese and Russian weather satellites. He signs on nightly and provides this service from 2300 UTC +. Heard 0100 UTC +. (Perdue, AL) *Yes, I have been there, Neal. It is a very pretty place-Larry.*
- 6218.6 KY1174-Greenville, MS Limited Coastal station working M/V Susan Kay with instructions at 2245 in USB. (Perdue, AL)
- 6221.6 KMH-Golden Meadow, LA Limited Coastal station working M/V Larry ----- ? at 0020 in USB. An old timer but never previously heard. Also heard WBV-Port Richmond, New York, working M/V Emerand for position report. Heard at 0105 in USB. (Perdue, AL)
- 6224.0 Unid maritime station IDs as Nordam settling on this frequency with phone patch for M/V Amsterdam after trying 6218.6, 6221.6 and 6223.0. That's one way to avoid QRM -- roll your own frequency. At 0115 in USB. (Perdue, AL) *Probably is Norddeich Radio-Larry.*
- 6666.0 Fishing boats or smugglers? In USB a female with a male giving her data and #s, then female asked question with "American" at end of question. Several other stations on the frequency with single letter IDs, in Spanish with some whistling for a response. Female appeared to act as net control at 0225. (Fernandez, MA)
- 6735.0 Called from 270.2 UHF with Amos 7 and 18 talking to Mind Control and Mind 1 and 2 to Mind Control (I think this is Fresno Air Terminal). Then Amos 18 talked about returning to Tucson instead of returning to Ranch House. (This was Travis AFB.) Amos 6 and Sierra Pete with radio checks. Fresno CP talked about moving to main CP. This was four hours of continuous traffic ending 1804. Other aircraft noted included: Lido 27, Amos 01/02/06/11/13/15-19 and Kato 12. In USB. (Brinkley, CA)
- 6738.0 Beaver working Eclipse (I think this is the USS Abraham Lincoln CV-72) through McClellan GCCS talking about a fly-by of E-2s and Dragon Fire 702 coming aboard with a code 4. (Brinkley, CA)
- 6785.0 WK4469 working WK402 with chit-chat also heard WK403 in USB at

0310. Whozit? (Hill, MI) See column, Army Corps of Engineers-Larry.

6855.0 Spanish female five-digit number station at 0700. (Harwood, CA)

6984.0 J15 working J83 in USB at 2243 then went green. (Robinson, TN)

7422.0 NMN-USCG COMSTA Portsmouth, Virginia, working Sierra 1 at 0300 in USB. (Robinson, TN)

7423.0 Spanish female four-digit number station at 0215. (Harwood, CA)

7525.0 Gull 237 working unid station at 1954 in USB. (Battles, NH)

7535.0 Norfolk SESEF working Manitowac at 1822, Thomas Hart at 1543, Saginaw and El Paso at 1350. Also used 361.2 UHF and 32.050 for test. (Scott, AZ) *Norfolk area folks take note-Larry.*

7832.5 AIR-Andrews AFB, Maryland, with USAF MARS messages at 0213. RTTY 850/45. (Blair, CA)

7884.0 E3B calling 080 but no reply, then shifting to another frequency IDed with a designator at 0604 in USB. (Fernandez, MA)

8291.0 WGW-San Juan, Puerto Rico Limited Coastal station working the tug Bruce McAllister WYP-4760 at 2346 in USB. (Perdue, AL)

8496.5 Casino Royale-Westover AFB, Massachusetts moved MAC comm frequency from this one to 8498.0 in USB at 1910 and referred to 4342.5 as night frequency. Also mentioned CP UHF frequency 252.1. (Wilczynski, MA) *Weird, R.J., and welcome to the column-Larry.*

8768.5 DAJ-Norddeich Radio, Germany, with traffic list, ID and phone patch traffic with unid ship at 0050 in USB. (Perdue, AL)

8855.0 Porto Velho Aero, Brazil. Female working male at Recife Aero in Portuguese at 0911 in USB. (Perdue, AL)

8912.0 Slingshot, Ping Pong, Hammer, Princess, Omaha 55 in clear discussing bogey coordinates, picking up an airplane's drop at 0355 in USB. (Edmunds, FL)

8975.0 RAAF aircraft calling AF Sydney at 0833 in USB. (Scott, AZ)

8989.0 Hanover with phone patch to unknown Navy operations, had 5 A-6 crews aboard and would arrive at 1400 UTC. At 0350 UTC Old Salt (USS Nimitz) called Hobo about flying schedule. (Harwood, CA)

9006.0 Tuna Fish working Andrews AFB. Tuna Fish was in Saudi Arabia. Then went to "151 Upper" and I couldn't find them again. (Frantz, GA)

9023.0 EAM message from Jarseal to Potroast saying did you receive the "431" message. Then Potroast to Astrocat to go to 252.0 Uniform at 1729 in USB. (Brinkley, CA)

9041.0 English female three/two digit number station at 1510. (Brinkley, CA)

9121.5 Raymond 17 (Moody AFB, GA) with radio maintenance and Redstone 03. Convoy information and arrangements for forklift and flatbeds for upcoming squadron barbecue. Noted at 1302 in USB. (Frantz, GA)

10478.0 Unid station Romeo Papa conducting radio checks with others: UW/WI/DQ/PT and BK at 0440 in USB. (Miles, NY)

10562.0 CKMB-unid with RYs de C5KMB and 5L groups at 0129-0131. RTTY 265/75. (Blair, CA) *Wow, who the heck is that-Larry?*

11108.0 German female three/two digit number station at 0642. (Fernandez, MA)

11129.0 2C (vehicle) working 9X (base). Military vehicle (hummer) traveling south on US 17 from Wilmington, NC thru Myrtle Beach, South Carolina. Gave position reports as they drove in USB at 1650. (Frantz, GA)

11176.0 Gull 34 (WC-130) working MacDill with phone patch to Miami Hurricane Monitor. Passing weather information then moved to 13210 for detailed trouble shooting of SATCOM channel # unknown 316.975 MHz and channel #3 243.875 then moved to 11226 due to noise. (Wilczynski, MA) *Interesting, R.J. 316.975 (uplink) and 243.875 (downlink) are Whiskey bandplan channel 11, satellite bufs take note, possible good area for some clear traffic from the hurricane hunters-Larry*

11189.0 Two fishermen very unhappy about fines levied for not using dolphin panels in nets at 1312 in USB. Odd frequency for fishermen. (Edmunds, FL) *They pretty much go where they want to-Larry.*

11191.0 In USB at 0030 Charlie working FT7/7CK/4SY/WFT (aircraft, I think this was a stealth bomber)/BX/FTC/SBW/HC/XAB/XDE/Alpha unit. Delta 24 and a mention of other units finding the stealth bomber yet? FT7 was relaying comms to 7CK and 4SY. (Wilczynski, MA)

Cowsmith passing tracks to Hersey (using line item format) at 1630 in USB. (Edmunds, FL)

11209.0 Musket control, Musket ground, Star 1/22/23/24/32. Tankers and bombers mentioned near Cold Lake. Canadian military-Cold Lake is south of Primrose Lake weapons area, Alberta at 1315 in USB. (Frantz, GA) *It's real pretty up there, Bill-Larry*

11266.0 Pre-recorded college football scores being played for Trout 99 (C-135?) and SAM 205 by Andrews AFB then made a patch to Hickam saying he was a code "B" aircraft and SAM 205 had a DV3 aboard at 0156 in USB. (Brinkley, CA)

11271.0 MAC 7798 (C-141) with phone patch via Trenton Military to McGuire AFB at 2220 in USB. (Brown, MA)

11420.0 Alpha Oscar Kilo calling All American with no reply on frequency Oscar

GUIDE TO UTILITY STATIONS 1991

9th edition • 520 pages • \$ 43 or DEM 60

Our bestseller covers the complete frequency range between 0 and 30 MHz. It is the only publication in the world covering the effects of the Gulf crisis and of the recent revolution in Eastern Europe as well as the current sunspot maximum, with up-to-date frequencies published **now** and not five years too late! The new channelling plans for the most extensive frequency transition in the Maritime Mobile Service during the nineties which will take place on 01 JUL 1991, and latest technical developments such as the multitude of new ARQ and FEC teleprinter systems, are covered exclusively by our UTILITY GUIDE. Sophisticated operating methods and regular overseas monitoring missions (1990 for months in Guatemala, Malaysia, Singapore and Venezuela) complete this unique book.

The completely revised new edition includes a frequency list with 18233 frequencies, and a call sign list with 3376 call signs. Up-to-date schedules of FAX meteor stations and RTTY press services are listed both alphabetically and chronologically. Abbreviations, addresses, codes, definitions, explanations, frequency band plans, international regulations, modulation types, NAVTEX schedules, Q and Z codes, station classes, telex codes, etc. - this reference book lists everything. Consequently, it is the ideal addition to the World Radio TV Handbook for the "special" stations on SW!

Further publications available are *Guide to Facsimile Stations, Radio-teletype Code Manual* (10th editions) and *Air and Meteor Code Manual* (11th edition). We have published our international radio books for 20 years. They are in daily use at equipment manufacturers, monitoring services, radio amateurs, shortwave listeners and telecommunication administrations worldwide. Please ask for our free catalogue, including recommendations from all over the world. All manuals are published in the handy 17 x 24 cm format, and of course written in English.

Do you want to get the **total information** immediately? For the special price of \$ 164 / DEM 230 (you save \$ 29 / DEM 40) you will receive all our manuals and supplements (altogether more than 1500 pages!) plus our *Cassette Tape Recording of Modulation Types*.

Our prices include airmail postage to everywhere in the world. Payment can be by \$ or DM cheque or cash. Dealer inquiries welcome - discount rates and pro forma invoices on request. Please mail your order to ☺

Klingenfuss Publications
Hagenloer Str. 14
D-7400 Tuebingen
Germany

in USB at 0427. (Fernandez, MA)

13207.0 Arm Hold working Train Man at 1940 in USB with SATCOM test. No joy. (Battles, NH)

13250.0 Nighthawk with MARS type phone patch in USB at 2114. (Hill, MI)

13330.0 Juliet-Oscar 55 Alpha working unid LDOC for phone patch to dispatch and weather for Chicago in USB at 1022. (Hill, MI)

13440.0 Mr. Grey on aircraft from Africa calling for Steve from IRS. Discussed doing a piece on Ethiopian hunger. Said Today show spot was off at 2123 in USB. (Burke, AZ) Scott, you win the most bizarre log of the month award. This one truly fits the category-Larry.

13582.0 ECY3 unid with VVV de ECY3 in CW at 1515. Whatcha tink? (Blair, CA) *Probably the same thing you came up with, Spanish, but I couldn't begin to hazard an educated tink-Larry.*

14818.5 NNNOCUL-USS Semmes (DDG-18) conducting MARS phone patches at 1925. NNNOCZV-USS Hayler (DDG-997) working NNNONIG-Pensacola at 1938. NNNOCMB-USS Truett (FF-1095) working NNNONCG-USCG Alexandria, Virginia at 1855. NNNOCOA-USS Stephen W. Groves (FFG-29) setting up phone patches with unid station at 2052. All comms in USB. (Bob Pettengill, OK) *Welcome aboard, Bob. Please report often-Larry.*

17992.0 Mess Kit, Ping Pong and other SAC airborne CP units heard here at various times in USB. (Battles, NH)

18387.0 Pelican 1 marking targets and tracking with his gadget. Targets were moving slowly (3,7 knots) must be ships at 1820 in USB. (Edmunds, FL)

19295.0 German female five-digit number station at 1600. (Harwood, CA)

20742.5 GMN-unid station with 464646 QRU SK RTTY traffic marker at 1747. Any idea who, first time logged? (Hugh Hawkins, MS) *Not really Hugh, might be Interpol-Larry.*

20936.0 NNNOKRQ US Navy MARS Ashore trying to QSY with NNNOCOT USS Fairfax County LST-1193 from crowded 14 MHz channels but no joy (too late for propagation) at 2208 in USB. (Perdue, AL)

23287.0 D7E calling 180 with no answer at 2000 in USB. Atlantic/Caribbean HICOM channel. (Burke, AZ)

23315.0 Lotsa scrambled comms noted here at 1930 in USB. (Burke, AZ)

25222.5 WLO-Mobile Radio, Alabama, USA with CW ID and SITOP-A idler tones at 1930. (Fernandez, MA)

The Scanning Report

Bob Kay

c/o MT, P.O. Box 98
Brasstown, NC 28902

Scanning on Wall Street

When the *Wall Street Journal* published a front page article some months ago on *Monitoring Times* publisher Bob Grove and the hobby of scanning, news media from all over the country went on a feeding frenzy. Reading the *Wall Street Journal*, everyone suddenly decided to do their own story on scanning. What caught their attention? Cellular car phone monitoring.

Many members of the media were single minded. They wanted sleaze. *Monitoring Times* managing editor had one reporter who he describes as "a recognizable name," who repeatedly asked him to talk about some of the "dirty" stuff he heard on 800 MHz.

Like many of my colleagues, when I tried to downplay cellular monitoring to reporters and explain that it was only a very small aspect of our hobby, no one wanted to listen.

When NBC news called they asked if I would talk about cellular phones on television. "Sure," I said. "Bring out the cameras and I'll make a pot of coffee."

NBC: Before we visit your residence, would you mind answering a few questions over the phone?

KAY: Okay, fire away!

NBC: Do you listen to cellular phones?

KAY: Sure. But not very often.

NBC: Why haven't you listened more often?

KAY: Cellular monitoring is only a very small segment of the scanning bands. I also monitor the Space Shuttle, Coast Guard, military aircraft and hundreds of other agencies.

NBC: When you listen to cellular phones, what type of equipment do you use?

KAY: I use a 27 inch, Panasonic television set, model number CTL 2781S.

NBC: You listen to cellular phones on a Panasonic television set?

KAY: Sure, but I'm not trying to sell Panasonic TV's. You can monitor cellular phones on a Sony, General Electric, Zenith...

NBC: (Interrupting) Don't you use a scanner radio?

KAY: You don't need to buy a scanner radio to monitor cellular phones. Simply connect a standard UHF Bow Tie antenna to your television and tune across TV channels 80 thru 90.

NBC: What kind of people listen to cellular phone calls?

KAY: Common, everyday people that own television sets.

NBC: What type of antennas do you have on your roof?

KAY: I just moved, I don't have any antennas on my roof. But my neighbor has a large satellite TV dish antenna on his roof.

NBC: Can you use a television dish antenna to monitor cellular phones?

KAY: No. But you can use it to watch "pay" TV programs. Now there's an interesting story for NBC. Forget about cellular monitoring. Let's do a program on the people who erect satellite dish antennas and then use them to steal "pay" television programs. Heck, I'm paying nearly



When NBC news called Bob Kay, the topic of conversation was the sleazier side of cellular monitoring. However, Kay had a few surprises up his sleeve.

\$30.00 dollars a month for cable television. But my neighbor views the same programs on his satellite dish, for free!

NBC: Thank you for talking with us, if we need anything further, we will call again.

As you probably guessed, NBC never came out to my residence. When I refused to relate cellular monitoring with scanning, NBC decided to cancel the television interview.

Les Mattson, editor and publisher of *Northeast Scanning News*, eventually became so discouraged by the media's single-minded approach to scanning, he decided not to talk to any more reporters. Others have felt that any publicity for the hobby is good -- even if it focuses on the seamier side.

Should I have consented to talk about cellular scanning? What do you think? Here's your chance to sound off. Send your comments to the Scanning Report, P.O. Box 98, Brasstown, NC 28902.

Treasure Hunt

Scanning and photography seem to go hand in hand. Go to any air show and just about every person who has a scanner hanging from his belt will also have a 35 mm camera strung about his neck. In some of our reader's radio rooms, beautiful framed prints of local police, fire or other emergency services adorn the walls. Perhaps it's a desire to capture some of the excitement on film that binds the two hobbies together.

Shopping for that 35mm camera can be, however, a unique experience. In the display case, the camera and lens are together. But the price tag usually only represents the camera body--the lens is extra.

Shopping for a lens is another unique experience. A camera lens is rated according to its ability to focus sharply. A good lens could cost as much, if not more than the camera body!

And don't forget that this is the age of "auto focus." Gone are the days of twisting the lens barrel to bring your subject into focus. If you have the right equipment, the focusing and exposure are controlled by the push of a button.

Of course, if you're totally confused by "F" stops, film speed and flash exposure, choosing the "right equipment," can be a real problem. If you're nodding your head in agreement, I've got the perfect solution to all your camera problems.

The Minolta Corporation has donated a brand new camera to our March/April Treasure Hunt. The Minolta "Maxxum 3000i" is a 35mm autofocus camera that is very easy to operate. The camera features computer controlled autofocus, automatic flash, and automatic exposure control. With this camera, you get good quality, 35mm pictures, with the ease of a "point and shoot" camera.

Loading the 3000i is quick and painless. Simply open the back, drop in the film, and the camera will automatically advance the film as you shoot. After your last picture, the camera rewinds the film and the data panel reminds you to install a new roll.

To win the 3000i, you must answer the following questions:

1. Draw the Minolta logo
2. In addition to the 3000i, Minolta also features a 5000, 7000, 8000 and 9000 model. True or False?
3. What agency provided the cover photograph for the January 91 edition of *MT*?
4. In a recent survey, *Monitoring Times* was rated the #1 Radio Magazine in North America. True or False?
5. Name the inventor of the BNC connector.

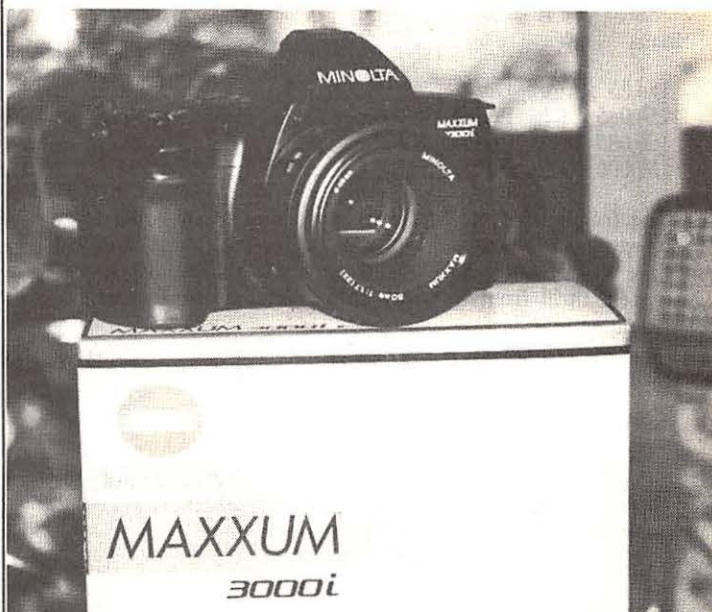
If you're chosen as our lucky winner, you will receive the Minolta Maxxum 3000i and a 50mm, 1.7 auto focus lens. You can see and hold the Maxxum 3000i by visiting your local Department store or camera shop. In the meantime, keep your fingers crossed.

One other thing: Be sure to follow our new rules. Remember that while multiple entries are okay, each must be mailed separately. Use postcards wherever possible. And do not FAX your entry.

Frequency Exchange

Welcome to Montgomery, Alabama. We are in the home of Rich Vickery and he has volunteered to provide us with a few of his favorite frequencies:

State Police	Forestry
154.920	159.420
155.445	159.450
155.505	159.330
	159.315
	159.465 Game Warden
Utilities	TV/Radio Stations
158.160 Alabama Gas	450.250 WLWI Radio
158.250 "	450.450 WACV Radio
451.575 Alabama Power	450.550 WBAM Radio
	461.350 WKAB TV
	462.60 WSFA TV



Maxwell AFB

164.175 Security
173.4375 Hospital

173.5375 Fire department

Taxi Cabs

152.270/157.530 "White" cabs
152.360/157.620 "Dependable" cabs
152.390/157.650 "Yellow" cabs

Grab your mittens and hats, our next stop is Fort Wayne, Indiana. Jack Forbing lives in this neck of the woods, and here are a few of his favorite frequencies.

47.580 School buses
156.225 Street department
160.320 N&W railroad
160.80 Conrail
463.875 Canterbury security
464.025 Citizens cable
464.40 D&L Communications
464.575 Glenbrook security
947.375 Westinghouse

FOR THOSE WHO LIVE NEAR COASTAL AREAS, BE SURE TO MONITOR THE MARINE BAND. COMMUNICATIONS BY CRUISE SHIPS, PLEASURE CRAFTS, COAST GUARD, MARINE PHONE CALLS, ETC., CAN BE HEARD. DON'T MISS THE ACTION MATE!

NORTHEAST SCANNING NEWS:



212 W. Broad St., Paulsboro, NJ 08066

The Scanning Report

Since you're already cold, let's skip over to McHenry, Illinois.

154.25 Fire Dept.
154.085 City Police
156.085 City Police
159.090 City Police

The frequencies for McHenry were sent in by Mike Lynn. Mike wanted to invite everyone in for coffee, but I'm afraid that we simply don't have the time. Snow ski enthusiasts will get a real thrill from our next stop. Welcome to Denver, Colorado.

City Police	Misc. Frequencies
453.10	151.115 Public works
453.45	155.940 "
453.60	453.175 Denver General Hospital
453.775	453.675 Housing Authority
453.90	453.825 County Sheriff
	856.4375 Airport Operations
	858.4375 Airport Maintenance
	859.4375 Airport Parking

Our final trip is to Green Bay, Wisconsin. However, there is one problem. The frequency list was sent in anonymously--so we don't have a place to stay. If you choose to go, you'll be standing out in the cold. Personally, I'm going home. For those of you that are continuing on to Green Bay, here are the frequencies:

153.260 James River Paper Co.
450.65 WIXX radio remote
461.575 Purolator Security
461.775 Boldt Construction Co.
461.850 Warner Cable TV
463.225 Airborne Express
463.425 Hurckman Heating Service
463.50 Pulaski Vet.
464.750 Clintonville Vet

Scanning Test

We'd like to thank everyone for the incredible response they've given the Scanning Test. In the January issue of *Monitoring Times* we introduced the first official scanning test -- a serious examination of scanning skill.

Here's a sampling of some of the mail we've been getting. Eugene Douglas, Jr., of Junction City, Kansas, says that "I think that what you're doing is great." "Great idea," writes Ron Gallo of Wyoming, Delaware. Charles Schilling of Garland, Texas, says that while he is "relatively new to scanning," feels that "the test will help me to focus on essentials and help monitor my progress." And Clive Merrick Morel of Playa del Rey, California, is already looking forward to progressing beyond novice. Says Mr. Morel, "I hope to pass all three of your exams throughout the course of this year...and I am looking forward to the challenge!"

We should be able to announce the names of the first successful candidates in the next issue. If you haven't send for the test yet, start boning up on your monitoring skills and send for the test. A non-refundable \$10.00 administration fee covers the test booklet, answer sheet, grading, and, if you pass, the Scanning Achievement Award Novice Certificate. You can get

yours from Scanning Test, P.O. Box 695, Honey Brook, PA 19344.

COMNET Nets Shoplifters

In Atlanta, Georgia, department store security guards have a new weapon to deter shoplifting. Instead of using a firearm or club, downtown security guards have been issued two-way radios that are linked to the police department. When a security guard in "Macy's" spots a shoplifter, he simply calls the police on his radio.

The new system is called, "COMNET." It is nothing more than a two way radio system that links the regular police with department store security guards. The cost of the radio equipment is incurred by the businesses that want the service. And according to recent statistics, COMNET can reduce retail theft by nearly 40 percent.

In a few years, COMNET is expected to be implemented in other major cities across the nation. If you live in Atlanta and have the COMNET operating frequency, send it to the Scanning Report, P.O. Box 98, Brasstown, NC 28902.

Phones on the Range

One of the most modern phone systems has linked the remote areas of West Texas to civilization, according to a clipping sent in by reader Bob Valen. It's now possible for cowboys to make telephone calls from the "branding corral"-- a weatherbeaten enclosure that is miles away from the nearest phone line.

Nope, I'm not talking about cellular phones. The system is called, "Ultraphone." It's a standard radio phone system. But unlike cellular phones that can be monitored, Ultraphone is totally private. The state-of-the-art digitized equipment compresses the radio signal and breaks it into fragments.

In addition to being totally private, Ultraphone is cheaper to install than a conventional cellular system. Customers that use the system also enjoy lower monthly rates.

As more Ultraphone systems develop, look for the cellular industry to offer lower rates, and to implement a digitized cellular network. If you've been monitoring cellular phones, make a recording and save it for your kids--the conventional cellular network will soon be retired to the pasture.

Vacationing in the Land of 911

When you go on vacation, do you take along your scanner radio? If so, I've got good news for you. The number #1 scanning spot in the Nation is New York City.

The New York City Police answer 20,000 to 30,000 emergency calls everyday. The highest number of calls in a single day was 42,787. Few people realize that New York City gets more 911 calls than any other city in the Nation. In 1989, the city received a total of 8.3 million calls.

If you're looking for a "scanning vacation" spot this year, talk your wife into visiting the "Big Apple."

Next Month

As most of you already know, I recently promised to provide you with a "No B.S. Guide to Frequency Counters." Well, keep your shirts on, it's in the making.

See you next month.



STARTEK INTERNATIONAL, INC.

- 8 DIGITS
- 2 GATE TIMES
- ALUMINUM CABINET
- AC • DC • BATTERY
- FULL YEAR WARRANTY

Absolutely the best values in the frequency counter industry. Choose either the **STARTEK** Model 1500A or the 1500HS for finding and counting RF frequencies from 1 to 1500 MHz (1.5 GHz). The 1500HS is the same size and has the same features as the 1500A but in addition contains Monolithic Microwave Integrated Circuit, Low Noise Amplifiers which provide an **"ULTRA HIGH SENSITIVITY"** signal input. The 1500A can be purchased without the custom NI-CAD batteries and AC adaptor, the 1500HS is priced complete. Both counters can be powered by 9-12 VDC, an AC adaptor or internal NI-CAD batteries. The excellent HF to UHF sensitivity of these instruments makes them ideally suited for use with an antenna to find and display transmit frequencies from handheld, fixed and mobile radios such as: police, ham, surveillance, phone, marine, aircraft, etc. They can be used with the model #DC-10 Probe to measure computer clocks, oscillators, etc.

TYPICAL INPUT SENSITIVITY IN MILLIVOLTS RMS

FREQUENCY	1500 A	1500HS
10-600 MHz	5-30 mV	<1 mV
150 MHz	8 mV	.5 mV
800 MHz	50 mV	3 mV
1.3 GHz	250 mV	15 mV

1-1500 MHZ FREQUENCY COUNTERS

FROM
\$99⁹⁵

MADE IN USA



- #1500A 1-1500 MHz Frequency Counter Only\$99.95
- #BP-15 Custom Internal NI-CAD Pack (Installed).....20.00
- #AC-15 110 VAC to 9 VDC Adaptor/Charger 9.00

- #1500A/C Counter Including NI-CAD Pack & AC ADP128.95
- #1500HS HI-SENS Counter Inc. NI-CAD Pack and AC ADP169.00
- #TA-90 Telescoping BNC Antenna, General Usage.....12.00
- #DC-10 Probe, 50 OHM, 1X, 3 Ft. Cable20.00

MODEL DT-90 DRAM TESTER

The DT-90 is a new, compact memory IC tester that can READ/WRITE FUNCTION TEST, VOLTAGE TEST and MEASURE THE SPEED of 1 MEG x 1, 256K x 1 and 64K x 1 Dynamic RAMS. LED indicators show 3 Vcc TEST VOLTAGES and a RED/GREEN LED flashes when test is running then indicates PASS or FAIL. A switch is provided to continuously cycle a test if desired. The DT-90 is housed in a rugged aluminum cabinet 3.4" W x 3.8" H x 1" D. Two ZIF TEST SOCKETS are provided for the IC under test. The unit is powered by a 110 VAC to 9 VDC @ 300 mA adaptor which is included. The DT-90 is sold in KIT FORM with complete assembly instructions or FACTORY ASSEMBLED, calibrated and tested.

MODEL DT-90-CK
\$89⁹⁵ Kit
Form

MODEL DT-90
\$119⁰⁰ Factory
Assembled

TOLL FREE ORDER LINE

800-638-8050

FOR INFO PLEASE CALL (305) 561-2211



MADE IN USA

STARTEK INTERNATIONAL, INC.

398 NE 38TH ST., FORT LAUDERDALE, FL 33334

PHONE: (305) 561-2211 FAX: (305) 561-9133

ORDERS TO US & CANADA

ADD 5% S/H (\$4 Min., \$10 Max.)

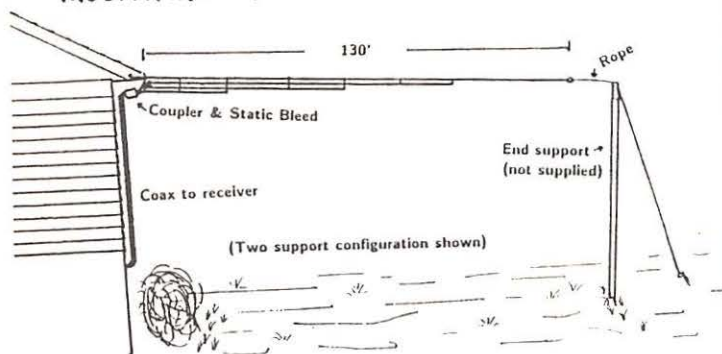
FL RES. ADD SALES TAX, COD \$3.50



what's new?

MULTIWIRE-4

ELECTRON PROCESSING INC CEDAR, MI USA



New Full-Size Shortwave Antenna

There are lots of short-wave antennas on the market today. Most are designed to function in as little space as possible and most of these work well, considering their size limitation. Listeners who have the room are almost certain to do better with a full-size antenna, however.

Electron Processing's new Multiwire-4 is a full-size receive-only antenna designed for the shortwave enthusiast who wants to wring every last bit of signal out of the air.

Comprised of four wire elements of different lengths joined together at a coupling box, the antenna covers all shortwave bands from .5 to 30 MHz. Quality components are used throughout its 130 foot length and the Multiwire-4 comes with everything you need -- except something to hang it on.

The Multiwire-4 retails for \$100.00 and is available from Electron Processing, Box 68-MT, Cedar, MI 49621 [616] 228-7020 or your favorite radio dealer.

Computers and Monitoring

Four years ago, it would have been nearly suicidal to suggest that a radio monitor use a computer. Few topics seemed to generate such venomous replies.

Now, with some industry estimates saying that fifty percent of monitors use computers in their hobby, it's a different story. Today, there are programs available that do everything from predicting the best time to listen for a particular station, to others that will give you a schedule, tell you the local time in the target area, or even teach you about the geography of the broadcaster's country.

In *The Radio Communications Software Directory*, author Jim Pogue surveys many of the major radio

The Radio Communications Software Directory



communications software programs available today. The field is crowded and the book will prove to be a helpful guide in selecting the one that can do the job best for you.

Radio Communications Software Directory is available from DX Radio Supply (P.O. Box 360, Wagontown, PA 19376. Mastercard and Visa orders only: 215-273-7823) for \$14.95 plus 1.55 book rate shipping or 2.80 UPS. It ships in late March.



Marine Radios by Panasonic

Whether on the open seas, Inter-Coastal

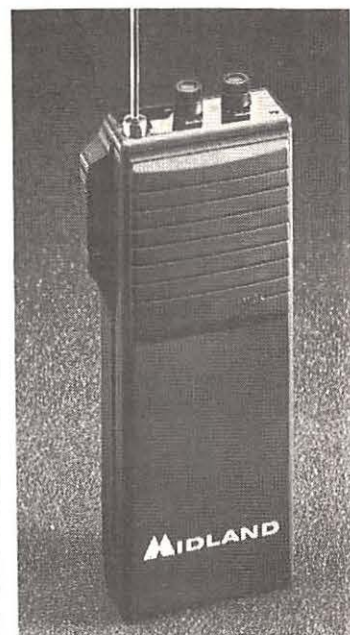
Waterways or a placid local lake, the ability to communicate is vital -- sometimes life-saving. Panasonic, whose name seldom leaps to mind when speaking about two-way radios, has introduced a high performance, handheld marine radio.

The KX-G1500 is a VHF radio that receives all U.S., Canadian and International marine channels as well as ten weather frequencies. And unlike most marine radios that automatically start at Channel 16 -- the emergency channel -- the KX-G1500 can light up with either Channel 16 or the last frequency tuned before the radio was turned off.

The 1.2 pound radio

comes equipped with a rechargeable NiCad battery, flexible antenna with BNC connector, three-step RF power output (1, 3 or 6 watts), and safety key lock.

The KX-G1500 is available now and retails for \$679.95 at your favorite radio dealer.



27 MHz FM Walkie Talkie

For those who prefer to avoid the marine bands, Midland International now offers a new, three-channel (all crystals supplied) 27 MHz FM walkie talkie. Small enough to fit in a shirt pocket, the ultra-compact model 75-160 is ideal for outdoor enthusiasts and industrial/business users such as construction and traffic crews.

The 75-160 provides maximum power allowed by the FCC and has a range of about a third of a mile. Power for the radio comes from a standard 9 volt battery.

For some unfathomable reason, Midland refuses to reveal the price of its merchandise, instead preferring that you contact them directly at 1690 N. Topping, Kansas City, Missouri 64120.

Euro Radio Convention

Jetting off to Europe in mid-May. Lounging at the luxurious four-star Hotel Terramar in Barcelona Spain. And evenings filled with all manner of radio seminars and hobbyists from around the world. It could be a radio dream come true.

The 25th Annual Meeting of the European DX Council will be from May 17th to the 20th and is being hosted by the Asociacion DX Barcelona (ADXB) and the magazine *Nuevo Maf Internacional*.

Rooms are a reasonable PTAS 7.000 per night and convention fees, which include all conference activities, cocktail, two lunches, one dinner, tourist tours and visits, is PTAS 10.000.

Deadline for registration is April 15th. For more information, write EDXC-91, Apartado 1275, 08080 Barcelona, Spain.



New FM Logbook

FM listeners and DXers will want to have a copy of the all-new 1991 *NRC FM Log Book*. Produced by the National Radio Club, the *FM Log Book* weighs in at nearly 2 and a half pounds with over 300 8-1/2 x 11 inch pages full of information. Divided into three sections, the main body of the book is sorted by frequency. Other sections are arranged by call letters and city/state.

Other information includes network and format, station construction permit activity and room for personal notes.

The 1991 *NRC FM Log Book* is

available from DX Radio Supply for \$17.00 plus 2.00 book rate or 3.05 UPS shipping. The address is P.O. Box 360, Wagontown, PA 19376.

Gulf War White Paper

The war in the Gulf has presented, along with untold accounts of suffering and tragedy, an opportunity for monitoring that is nearly unparalleled in recent memory. Seldom have people been able to use their radios for such an up-close and inside look at the workings of a world at war.

Pulling all of the information and frequencies together in this fast moving event takes a reporter's instincts -- something Texas-based monitor, journalist and regular *MT* contributor Steve Douglass does with awesome effectiveness.

Douglass' 20 page white paper contains a full frequency list that gives a complete guide on where to tune. There's also a list of the top 20 most active military frequencies, call signs and aircraft, a glossary of terms, and English-to-jargon dictionary. (Fighter pilots refer to Kuwait as "K-Mart," for example, and Saddam's elite Republican Guard troops as "sand bags.")

Also included is a basic list of 30-50 MHz VHF/UHF military frequencies for the Army and Marines.

It's all presented in an easy-to-understand way that's designed to help you stay on top of this continuing crisis.

The *Gulf War White Paper* is available from DX Radio Supply, P.O. Box 360, Wagontown, PA 19376 for \$9.95 plus 75 cents shipping (first class mail). Or use your Mastercard or Visa and call the DX Radio Supply Order Recorder™ at 215-273-7823 for 24 hour service.

Buy Sell Trade

Interested in finding a treasure -- a really hot radio at a low price?

Maybe you'd like to swap your current rig for something snazzier. Dennis Coffey, WA4YYQ, thinks that he can help. Coffey has begun publication of *Amateur Radio Classified*, a ham and shortwave equipment buy/sell/trade newsletter.

Amateur Radio Classified is printed in large, easy-to-read type and offers an inexpensive advertising alternative for its

HAM LICENSE PREPARATION

WRITTEN TEST STUDY GUIDES

All ham radio questions and answers with explanations. Choose Novice, Technician, General, Advanced or Extra Class.

\$5.95 Each + \$1.50 shipping.

All five manuals: \$26.95 postpaid.

HAM RADIO LICENSING MANUAL

All 1,931 questions, multiple choices and answers found in every ham license exam, Novice through Extra. (300 pages)

\$11.95 postpaid.

WRITTEN TEST COMPUTER SOFTWARE

Take sample ham tests at your IBM compatible keyboard. Study all 1,931 questions by license class and subelement. Four 5 1/4" disks cover every amateur radio license class.

\$19.95 postpaid.

MORSE CODE TEST PREPARATION

Set contains two 2-hr. cassette tapes

Code Teacher,	0-5 WPM	\$9.95
General Code,	3-15 WPM	\$9.95
Extra Code,	12-21 WPM	\$9.95

All Manuals, Code tapes, Software:	\$69.95
New Part 97 Ham Rules:	\$ 2.95

THE W5YI GROUP

P.O. Box #565101 - Dallas, TX 75356

VISA/MasterCard

(Toll free) 1-800-669-9594

PC SWL \$99.00

A Complete Digital Reception System

PC SWL contains the hardware, software, instructions and frequency lists needed to allow you to receive a vast variety of digital broadcasts transmitted over shortwave radio with any IBM PC or Compatible computer. The product consists of:

Demodulator
Digital Signal Processing Software
80 Page Tutorial Reference Manual
World Press Frequency List
Tutorial Audio Cassette with Samples

PC SWL automatically decodes Morse code, Radio Teletype, FEC (forward Error Correcting Code), SELCAL (Selective calling transmissions), and NAVTEX.

ADVANCED FEATURES:

Tuning Oscilloscope
Digital Waveform Presentation
Auto Calibration and Code Recognition
Continuously Tunable Filter Frequencies
Variable Shift
Adjustable CW Filter Sensitivity
Farnsworth Code Compatibility
Unattended Capture and Printing


Software Systems Consulting
150 Avenida Cabrillo "C"
San Clemente, CA 92672
(714) 498-5784

To have your new product or book considered for review in *Monitoring Times*, send it to Editor, 140 Dog Branch Road, Brasstown, NC 28902.

readers. So far, the publication runs three to four pages per issue.

ARC International
Radio
Classics
P.O. Box 245, Jonesboro, GA 30237

First Class Mail



If you'd like more information on ARC, contact Dennis Coffey at P.O. Box 245, Jonesboro, Georgia 30237.

Guide to Old Radios

Loaded with full-color photographs, *The Collectors Guide to Antique Radios* by Marty and Sue Bunis is a nostalgia buff's dream come true. The introduction to this pricing guide to antique radios explains the criteria for judging the condition of a radio as well as the rationale for pricing used in the guide.

Each listing contains a model number, basic description and key features which identify the particular radio. Printing quality is first class, using heavy, glossy paper. Lots of memories on first reading, and a great reference for the collector's shelf.

The Collectors Guide is \$16.95 postpaid from Marty Bunis, RR1, Box 36, Bradford, NH 03221.

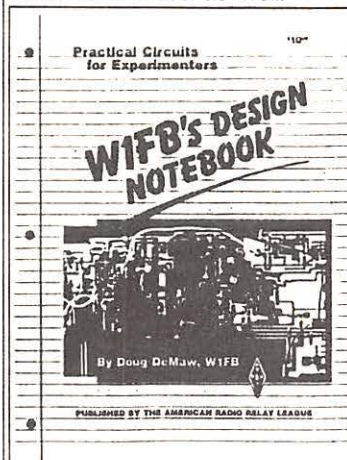
W1FB's Design Notebook

Venerable *MT* columnist Doug DeMaw has assembled a marvelous

collection of amplifier, receiver and transmitter projects for the home experimenter. Anticipating that newcomers may need some tutorial help, each project contains helpful theory.

A highly-informative introductory chapter explains the fundamentals of solid state circuitry, along with supportive examples of circuits and how they work. Differences among dozens of types of capacitors, coils, diodes, transistors and other components are carefully explained, with recommendations for uses.

With designs all centered around commonly-available parts, DeMaw's workbook is not only an excellent refresher for the veteran hobbyist, but would make a fine text for a hobby electronics class as well.



The 1990 edition of *W1FB's Design Notebook* is available for \$10 plus \$2.50 book rate or \$3.50 UPS from the ARRL, 225 Main St., Newington, CT 06111.

Scan Hawaii

Saying that it has taken "almost 10 years to research and six months to put together," Darrell R. Meacham is now offering his extensive *Hawaii Scanner Frequency Guide* for sale.

The *Guide*, which is computer generated and some 40 full-size pages long, has both local and national listings, from CB channels to local police and fire to Navy ships docked in paradise.

Mr. Meacham, who sub-

Ace Spectrum Analyzer/Logger for the AR3000

The wide frequency coverage of the new AOR AR3000 scanner is an open invitation to powerful peripherals.

Ace Communications has announced their Scanner Control System which consists of two interface cables, a floppy disk and a user's manual.

Requiring an MS/DOS PC compatible with at least 256K RAM, the newest version offers a menu-driven program for the companion AR3000 and any tape recorder with an actuator jack. All digital functions may be remote controlled from the host computer keyboard, communicating with the serial port at 4800 baud.

Computer-controllable functions include bank and frequency maintenance, automatic logging of selected channels, and a center-cursor spectrum display of the band being visually monitored.

The logging function provides signal strength data, frequency, mode, attenuator setting, description data (as previously entered by user), time in and out, and date for each call. All data may be called up for display, editing

and/or printing to an appropriate computer.

The spectrum display feature is unique. Using the AR3000's search banks 17-32, up to 1000 discrete frequencies may be loaded into memory. The display presents a horizontal sweep of 69 frequency steps at a time, with vertical spikes representing signals, the height of which are proportionate to signal strength. Up to 500 kHz may be displayed on a single screen, with up to 5 MHz viewable sequentially by scrolling screens.

The display may be scrolled left or right of the center frequency and the graph may be printed at any time with the Print Screen function key. Any description of the center (tuned) frequency will be displayed at the top of the screen.

The Ace spectral display and logging system is \$299 including shipping from Ace Communications, 10707 East 106th St., Indianapolis, IN 46256; or call 1-317-842-7115.

mitted a draft copy to us for review, says that the final list should be available in March or April and is \$7.00 including postage. Interested listeners may want to check with the publisher for availability before ordering.

Mr. Meacham's address is P.O. Box 6173, Honolulu, Hawaii 96818.

Industry News

Well known ham booster Gordon West has introduced a new concept at his Radio School. Radio School U is designed to help people get their ham radio licenses. Now, according to Gordon, there will be up to five different classes going on at the same time so that while dad and mom are working on their Extra license, the kids can be downstairs learning the stuff

for their no-code novice license.

For more information, contact Gordo at 2414 College Drive, Costa Mesa, California 92626 or call 714-434-0666.

International Radio and Computer has closed its operation at the Port Lucie location and consolidated their business and personnel at a new office in Fort Pierce. The new address is 3804 South U.S. 1, Fort Pierce, Florida 34982.

DX Radio Supply has added a new 24 hour phone number. Customers using Mastercard and Visa can place orders 24 hours a day on their automated Order Recorder™, ensuring even faster delivery. The number is 215-273-7823.



MIL-SPEC COMMUNICATIONS

P.O. Box 461 Wakefield, RI 02880 Call
Today (401) 783-7106

Military Surplus & New Communications Gear

Covering DC to Daylight at Discount Prices!



- AR-2515 Wide Coverage Scanner\$679
- AR-3000 Scanner\$895
- AR-900 Scanner w/cellular\$256
- ICOM R-71A HF Scanning Receiver\$850
- Collins R390A (Reconditioned/Calibrated) \$750*
- Japan Radio NRD-525\$1,150
- Sony ICF-2010\$349
- Sony ICF-7600\$220
- Sony Pro-80\$350
- RACAL RA-6790 (GM)/R-2174CALL
- AR-1000 Scanner\$455
- 3TF7 Ballast Tube - Brand New!\$40
- Bearcat BC-200XLT - w/Cellular restoration\$275

* Cost includes Federal Express Shipping

FREE DELIVERY TO YOUR DOOR!

WE OFFER REPAIR SERVICE • MANUALS • BROKERING
PROFESSIONAL MONITORING STATION
SEND \$2.00 FOR CATALOG CREDITED TO PURCHASE

Computer Aided Scanning

a new dimension in communications from Datametrics



Now you can enhance your ICOM communications receiver through a powerful computer controlled system by Datametrics, the leader in Computer Aided Scanning. The system is as significant as the digital scanner was five years ago and is changing the way people think about radio communications.

The Datametrics Communications Manager provides computer control over the ICOM R7000 or R71A receiver.

Powerful menu driven software includes full monitoring display, digital spectrum analyzer and system editor.

Innovative hardware design requires no internal connections.

Comprehensive manual includes step by step instructions, screen displays, and reference information.

Extends ICOM capabilities including autolog recording facilities, 1000 channel capacity per file, and much more.

Overcomes ICOM limitations such as ineffective scan delay.

Datametrics, Inc

R7000 system \$ 349
R71A system \$ 349
Manual and demo disk \$15

Requires ICOM receiver and IBM PC with 512K and serial port. The R71A version also requires an ICOM UX-14.

Send check or money order to Datametrics, Inc., 2575 South Bayshore Dr., Suite 8A, Coconut Grove, FL 33133. 30 day return privileges apply.

Rob Serardi's

Ham DX Tips

March could be termed as the start of "the second season" for ham DX. With enhanced propagation between the northern and southern hemispheres due to the vernal equinox (the earth changing its position in relation to the sun), there is increased activity in the form of DXpeditions and special events stations. You don't have to be a ham to log some of the rare and exotic locations and callsigns that may be active, so why not listen in and get a taste of ham DX?

CANADA - The Department of Communications - Canada has authorized all Canadian amateurs to use the following special prefixes in March and April to honor 100 years of Ukrainian settlement in Canada. The province and its normal prefix will appear in parenthesis: VO7=(Nfld VO1) VO8=(Lab) VC1=(Ykn Terr VY1) VC2=(PEI VY2) VA1=(New Brun & Nova Scotia VE1) VA2=(Que VE2) VA3=(Ont VE3) VA4=(Man VE4) VA5=(Sask VE5) VA6=(Alb VE6) VA7=(BC VE7) VA8=(NW Terr VE8) and DOC communications will use VC9. Also look for special station VA100U to be active all bands 10 to 80 meters for this event period. Send QSL's and reception reports for VA100U to: John Sklepkow, 300 Deloraine Ave., Toronto, ONT, Canada M5M 2B3. You may send your reports to the others using special prefixes to

their addresses (listed by their normal prefix and suffix) in the radio amateur callbooks. **CANARY ISLANDS** - GD0AVF (H. Robins, Fairisle, Foxdale, Isle of Man, United Kingdom) will operate from here as EA8BUC during the entire month of March using the following SSB frequencies: 14238 18162 21427 24945 28835 kHz. Reports go to his home address above. **CHRISTMAS ISLAND**: Three German amateurs will end a DXpedition tour of Pacific islands by operating from here 6 and 7 March, all bands and modes (SSB, CW, and RTTY). Reports for each station will go to the operator's home address: VK9XC (by DJ4OI, Christian Schmitz, Rubensstr 3, V-3101 Eldingen, Germany) VK9XE (by DJ1UJ, Guenther Biebing, Ludwigshafenstr 120, V-6708, Neuhofen, Germany) VK9XA (by DK7UY, Wolfgang Blau, Gernersheimerstr 85, V-6725 Roernerburg, Germany). **IVORY COAST**: TU2QQ has been showing up almost daily on 17 meters, between 18111 and 18120 kHz starting at 1700 UTC. Send your reports to: Joel Perret, P.O. Box 453, Abidjan 01, Ivory Coast. **MALAGASY REPUBLIC**: 5R8JD and 5R8JS appear on 7050 kHz (SSB) daily at 0345 UTC. 5R8JD has his QSL's handled by QSL manager: F6FNU Antoine Baldeck, Box 14, F91291 Arpajon Cadex, France. 5R8JS

uses QSL manager: F5IL, Jean Claude Lebourg, Chemindes Buyerers St Lubin, La Mesangere, F-27400 Louviers, France. **NAVASSA**: This U.S. Caribbean possession not only counts as a country, but offers the rare "KP1" prefix, and for those who are collecting locations for the Islands on the Air award, this is one of the rarer islands (having no resident population). Look for W5IJU/KP1 from 27 March to 4 April operating all bands SSB, CW, and possibly RTTY. W5IJU has yet to decide upon who will handle the QSLing duties. **SOLOMONS**: H44AP (Al Pearce, P.O. Box 11, Honiara, Solomon Islands, Pacific) tries to make contact with North Americans daily on 3795 kHz starting at 1000 UTC. **TRISTAN DA CUNHA**: ZD9BV, Andre, and his wife Lorraine, ZD9CO, appear most days on 28450 kHz at 1300 UTC. If you log either of the two send your contact QSL or reception report to their QSL manager: John Parrott, P.O. Box 5127, Suffolk, VA 23435.

DX MANUAL IN BRAILLE FOR HAM BAND DXers: San Diego Braille Transcribers Guild, Inc (1807 Upas St, San Diego, CA 92103) has "DX Around the World," a 55 page Braille reference manual edited by Larry Cox, WA6AIL. Besides being an introduction to ham DX, the book also lists DXCC countries, their prefixes, time zones, CQ and ITU zones. Also a section discusses sunspot cycles and the solar index.

Well, that's it for this month, and may all your DX be rare! 73 de Rob

Power Trips, a Beginner's Guide to batteries

This month it was the aftermath of Christmas that gave me a useful topic for beginners (and some old-timers who realize they need to be reminded of a thing or two). You remember Christmas -- that is why all of your credit cards are run up to the limit as you enter the second quarter of 1991.

You're going to have to tell me where this one is going, Uncle Skip!

No problem, Big Guy. If you'll remember, amongst the holly, tinsel and good times had by all, the dedicated parent's thoughts turned to -- BATTERIES.

Getting enough of these little puppies plugged into various toys and gadgets can occupy a person for days on end. By now, we are probably also trucking around tracking down replacement batteries for whatever new radio gizmo Santa put under the tree for us, too.

The modern world, in its constant march toward complexity (as the 'round about way to achieve entropy) has hit us with multiple choices in the battery buying market. In an effort to get the right cells into the right sockets, Uncle Skip's Ether Engineering and Martial Arts Delicatessen presents --

A BEGINNER'S GUIDE TO BATTERIES

If you want to sound really hip when talking battery lore, first we have to clean up your terminology. "Battery" by the strictest definition means a bunch of something. In this case a "battery" is a collection of "cells."

Your common garden variety "D" cell puts out 1.5 volts. Your automobile battery is usually made up of six individual two-volt cells for a total of 12 volts. That is why you have to pour distilled water into six little holes instead of just one when servicing your car. So when you buy those little cylinders at your neighborhood discount store, you are really buying cells.

The exception is when you buy one of those little square nine-volt do-dads for your el-cheapo portable radio or bathroom scale; then you are buying a genuine battery made up of six teeny 1.5 volt cells. Get the picture?

Batteries as we have come to know them

Back in the 50s and 60s when we Baby-boomers became substantially more than a

glimmer in our parents' eyes, the world got along just fine with two major types of cells: the Carbon-Zinc type which we generically referred to as the flashlight battery, and the ever present Lead-Acid cell that to this day is known to all as the car battery.

These cells, like all others, convert a chemical reaction into useful electricity. To date, the Lead-Acid cell remains the prime electrical mover in most motor vehicles. The classic Carbon-Zinc cell, while getting the job done, is known for idiosyncrasies that plague it to this day.

Carbon-Zinc cells have a limited shelf life because they have a tendency to dry out over time. Also, the early days of this type of cell were plagued with corrosion and the oozing of goo as they wore out, often destroying the appliance they were placed in. The development of "leakproof" construction eliminated most of these problems. Carbon-Zinc cells are still the cheapest form of portable electricity available. As long as they are replaced within the limits of their shelf life, they are practical.

With the development of portable electrical devices such as cassette recorders and multiple feature radios, the world sought a cell that could give a longer shelf life and handle a heavier load.

The '70s may have brought such national tragedies as Disco music, but somewhere in the wasteland good ideas surfaced. The world became aware of the Alkaline cell. With the same 1.5 volt package as the Carbon-Zinc cell, the Alkaline chemical process produced vastly better operating characteristics over its older brother. Today, we use Alkaline cells in most gadgets around the house.

Also, modern electronics required a power producing device that could deliver a constant low current for long periods of time for devices such as hearing aids, cameras and digital watches. The world came to know and understand the Silver-Oxide cell and the Mercury cell.

A brief safety interlude

1. Never dispose of any cells by fire. The chemicals that safely produce electricity can become most violent when heated.
2. Keep those teeny Mercury cells away from children, especially those who are in the "swallow anything" stage. There is enough mercury in one of those cells to end the life of the average child.
3. Take Lead-Acid batteries to approved



The 1960's brought about the first handheld portable radios and the advent of the square 9-volt battery.

recycling locations. The environment will thank you.

Back to the battery business

The '80s signaled the computer generation and we began to run across cells that were about the size of a quarter that were incredibly expensive when compared to the other cells on the shelf. These are Lithium cells. You will find them in clocks and in devices that have "long term" memory storage. Some general coverage receivers and scanners use Lithium cells to run the memory that stores all those neat frequencies you like to keep handy.

The Lithium cell is the optimum battery development that you are likely to find in common usage. The circuits designed around the Lithium cell's characteristics often give it a useful life in excess of three years. This performance brings with it a problem. You tend to take the cell for granted. Murphy's law indicates this little gem will go south on you just when you least expect it. So while these cells are expensive, you will want to invest in a spare as you approach the second year or so.

Okay, so as we round the corner toward the 21st century, we have all these neat cells humming along in all of our electrical gadgets, games and goodies. But that presents the device users (read that, addict) with a problem. Many folks are wearing out the brake linings on their cars making trips to the neighborhood battery emporium. The world sought a better solution to constant cell replacement.

Enter the rechargeable cell

We have had rechargeable cells since before Edison convinced the world that he invented the light bulb. The good old Lead-Acid cell system is rechargeable.

Recharging works by reversing the electrochemical process. When you use a cell, a chemical reaction between two substances produces electricity. As the electricity is used, the involved substances go through changes. Continued use changes the substances until they can no longer effectively produce electricity.

In some types of cells (Carbon-Zinc, for example) this change is very difficult to reverse. However, in the Lead-Acid cell, reversal is simply a matter of applying electricity to return the substances to their original electricity-producing ways. This is how your car's generator normally keeps your auto battery up to the job of starting on those cold mornings.

Since it was a known fact that this was a possibility, the world cried out for a rechargeable, portable cell that did not involve the handling of dangerous sulfuric acid. The answer came in the form of the Nickel-Cadmium cell.

Ni-Cads (short for Nickel-Cadmium) are now available in all the popular sizes that you find common garden variety cells. The key to making these puppies live long and prosper is correct use and recharging.

First and foremost, you must acquire a charging unit that meets the needs of the cells you are utilizing. In some cases, this is included with the cells or it may even be built into the circuits of the appliance involved. In any case, the bottom line is, no charger, no juice out of the cells. Proper charging involves allowing the cells to charge for the period of time recommended by the cell manufacturer.

Another part of this deal is that you should never allow Ni-Cad cells to fully discharge. If a Ni-Cad is allowed to hit zero, it can reverse its polarity resulting in a short or permanent cell damage when you go to recharge it. It is best to allow cells to only drop to about 50 percent or so. This is hard to gauge if you don't have the cells on a meter at all times, but, in most cases, the equipment the cells are used in will start to degrade in performance, giving you the right idea.

Normally, it takes about 12 hours to recharge a Ni-Cad cell. As you move through the battery world, you will see "fast charging" systems for sale that allow you to bring a cell up to speed in around four hours. These systems do work with certain cautions. You need to determine if the rapid charger automatically reduces the current it produces when the cell hits its fully charged state. If it does not, the cell's life can be significantly reduced or the cell might even be destroyed. A quick look at the manual will let you know

where you stand with this type of charging system.

If you take good care of your Ni-Cads, remembering the few simple guidelines listed above, they should be good for something on the order of 300 to 500 recharging cycles. That means they only need to be replaced about once a year under daily use. Ni-Cads cost about three times as much as equivalent Alkaline cells; however, even taking the conservative figure for recharging, you are still ahead one hundred times over.

Many portable receivers, scanners and accessories now take full advantage of Ni-Cad technology by utilizing custom-designed "battery-packs." It used to be that when these packs went 100 percent failure you had to return to the equipment manufacturer to get replacements. This is no longer the case, as an entire industry has arisen out of the need to replace the cells in these packs. Battery-pack inserts are available from many advertisers that regularly appear throughout the radio hobby press. In some cases, improved battery-packs are available that allow longer use between recharges and longer overall life.

One common practice that you may find useful is to keep two sets of Ni-Cad cells or two battery-packs. This costs a bit more money but it allows you to keep one set recharging while the other set is in use. This way, when one set is below par, you simply snap in the others and go right on listening.

If you are a strong believer in Murphy's law, you will also want to keep a set of more conventional Alkaline cells around for those times when running a recharging system is neither convenient or possible. What if you are trying to make sense out of a local power outage by listening to your handheld VHF scanner and your Ni-Cads run out? Where you gonna plug in, Bunkey? The Alkalines will allow you to continue to follow the action.

It's a battery operated world

As solid state electrical circuitry continues to shrink in size and power requirements, we will all be making more use of the portability that batteries allow. These days you can even carry a fully operational computer in your brief case. Shortwave and scanner receivers continue to cram more and more features into teeny tiny boxes.

If your wallet allows, you can now carry all facets of the radio monitoring hobby, listening, recording and data management hardware with you to the ends of the earth with nary a wall outlet in sight. Batteries give you that much power. Of course, stand by for further advancement in battery technology.



NEW!!!

DIRECTORY OF MILITARY AVIATION COMMUNICATIONS (VHF/UHF) Europe, North Africa, Middle East FIRST EDITION, 1991

- Only Directory of its kind today
- Cross-referenced by both location and frequency
- Over 6,000 up-to-date frequency listings
- Covers 30-400 MHz

\$19.95

plus \$8 overseas airmail;
\$3 shipping to U.S. addresses

please allow 4 to 6 weeks for delivery

★ ★ ★

DIRECTORY OF NORTH AMERICAN MILITARY AVIATION COMMUNICATIONS (VHF/UHF) 1990-1991 EDITIONS

- Four regional editions - NORTHEAST, SOUTHEAST, CENTRAL and WESTERN
- Still the only Directory of its kind with cross-references by both location and frequency
- Covers 25-420 MHz
- Over 20,000 up-to-date frequency listings

\$14.95

each edition; \$49.95 complete set (4 volumes),
plus \$2.00/volume shipping & handling
NJ residents please add 7% sales tax.

FOREIGN ORDERS must be payable in U.S. dollars. You may use Visa, Mastercard, Personal Check or Postal Money Order.

Sorry, no CODs.

We do not assume responsibility for losses other than providing proof of shipment.

Visa, Mastercard Orders

call 1-800-542-SCAN


(open 7 days)

HUNTERDON AERO PUBLISHERS

P.O. Box 754
Flemington, NJ 08822-0754 USA

SEND FOR OUR FREE CATALOG

In the Eye of Desert Storm



Frequency	Mode	Description
248.900	voice nbfm	MARISAT
261.700	voice nbfm	FLTSATCOM
262.550	voice data	FLTSATCOM
262.950	voice nbfm	FLTSATCOM
264.900	voice nbfm	MARISAT
269.475	voice nbfm	AFSATCOM
269.550	voice wbfm	AFSATCOM
288.000	voice data	FLTSATCOM
295.075	voice wbfm	AFSATCOM
305.550	voice wbfm	AFSATCOM

*MYSTIC STAR Monitoring Times Graphic

Has anyone been focusing on anything other than communications coming out of the Gulf War? If you are like me, you have been listening in on all the bands.

The phone has been ringing off the hook since it all began. Everyone seems amazed that you can actually hear the military units in action. I am amazed that everyone with a shortwave radio or scanner or media credentials seems to call me to get frequency information. I've had more volunteers to help me listen in than I knew what to do with.

Most of the military communications are scrambled, but a surprising amount of them are in the clear. Sometimes the encryption equipment won't work or in the heat of battle a unit will forget to scramble.

DAY ONE: A personal view

It started this way for me:

It was 4:30 in the afternoon. I grabbed a Coke and went into the radio room to turn a few knobs, check a few frequencies and generally see if anything was going on. It was the day after the deadline for Iraq and I knew that soon the first attack would come.

I was tired. I really needed the caffeine from my Coke to keep me awake. I had been up all night with a buddy, who brought his gear over and we listened in to see if the hostilities were going to break out. It was a strange feeling to be hoping war wouldn't break out and yet knowing that if it did, the communications would be exciting.

The five shortwave and two scanner receivers were filling the air with the empty white noise of static. I started to doze, the lack of sleep from the previous night catching up with me.

I was awakened by a loud tone ringing in my head. In my groggy state it took me a moment to realize the sound was coming from my radios. Suddenly more scrambled communications than I had ever heard at one time came spilling out of the seven receivers like a tidal wave. Previously silent Navy and Air Force shortwave networks, that over the past two weeks were only passing radio checks, were up and booming with tactical activity. The adrenalin began to rush and I was wide awake with the realization that the war had begun.

I called my friend at a local newspaper and told him what I heard. He checked the Associated Press wire. Nothing. Not a word on any of the wire services. I felt foolish. Maybe it was a false alarm. But the way the radios were still squawking it had to be

something.

I had an automatic scanner recorder taping it all. I decided to play the tape back and see what I might have missed. I rewound the tape, played it back and the evidence was all too clear. Something extraordinary was happening.

A big, booming, slightly distorted voice shook me to attention. "This is Lima Alpha Charlie with priority traffic for all SAC, MAC and TAC forces, stand by to copy." The power of the transmitter was overwhelming and the same voice could be heard simulcasting on several frequencies.

"All stations do not answer, message follows in 52 parts." A short pause and then the 52 phonetic letters that represented the message did indeed follow. The same booming voice transmitted on many channels at once. It was even on a UHF AFSATCOM channel!

It sounded weird, a slight echo as it was delayed on some of the frequencies. My hair stood on end. This was all the convincing I needed. I stayed glued to the radios turning and punching knobs and buttons, checking the other bands. The military channels were jammed with traffic. I flipped on the TV as well. The national news was coming on.

I listened intently to the live report from Baghdad. The reporter said it was a quiet night with nothing much going on. I started to doubt what I had heard. Was it just some massive exercise?

In mid report the Baghdad correspondent stopped talking. Suddenly it was apparent by the change in his voice that something was wrong. You could hear the explosions in the background and from the report it was clear. Baghdad was under attack. The war had begun.

With the help of the national media coverage and constant missile warnings, certain patterns develop that let you know what is happening even on the scrambled channels. For example, I can tell when a cruise missile attack is about to be launched when Navy radio activity increases and warnings to civil aircraft appear on the international air traffic control channels.

Also SCUD missile attacks can be heard this way. There will be a flurry of scrambled radio traffic leaving bases indicating aircraft launching and getting out of harm's way. You can see the departures on live TV. Then comes an announcement on MAC shortwave channels to all aircraft flying, not to land or divert to other bases because of a SCUD missile alert.

I have called NBC news and told them that a SCUD missile attack was imminent, sometimes beating the Saudi reporters by only seconds. I get a kick out of being referred to on TV as an "informed source" or as "radio reports indicate." Soon on live TV the sirens would sound and the reporters would duck and cover. It is kind of weird saying it on the phone here and seeing it come out there.

Listed in the tables are the military frequencies that were the most active during the first week of the war. Some are Navy, some are SAC Giant Talk frequencies and some are GCCS Mystic Star channels. Also a lot of activity could be heard on Royal Air Force HF frequencies. Most of the more audible communications were in the shortwave bands, while some were conducted on the UHF military satcom frequencies (see Table 2).

Some other excellent sources of information are the shortwave broadcast stations like the Voice of Israel, Baghdad Radio and even the Voice of America. The Voice of Israel was a great source of information on the Iraqi SCUD missile attacks on Tel Aviv and Jerusalem, and Baghdad Radio is a source of the latest ravings from Saddam Hussein himself. But not for long. I am sure that soon the radio transmission facilities as well as Iraqi TV will be destroyed.

If you've read Larry Van Horn's feature this month, and you've memorized the Federal File charts below, and you *still* want more, I can recommend a source: Steve Douglass, one of *Monitoring Times'* contributing writers, had so many requests from the media for frequency information that he has produced a 20-page White Paper on monitoring the Gulf. Listed in this guide are the most active Desert Storm military, Air Force Giant Talk, Navy and Mystic Star frequencies as well as the shortwave

For Military Monitors Only

T-shirts designed exclusively for M.T. readers by M.T. author Steve Douglass



Cobra Belle 100 Mission Shirt- Packed with eavesdropping gear, the men of the 55th SRW who fly these dangerous missions call it "Tickling the Bears tail" and is the inspiration for this colored hand silkscreened shirt.
100 % or 50/50 Cotton, White Only
State Size S,M,L,XL, XXL (add 1.00)
Add \$3.00 Handling Charge
6 to 8 weeks delivery
Money Orders Only



Giant Talk Shirt- B-1, B-2, B-52 Bombers surround this colored hand silkscreened design & even the Giant Talk frequencies are listed.

Payable to Just Tees'n
Monitors Only
6303 Cornell
Amarillo, Texas 79109

T's \$12.00
Sweats \$18.00

international broadcasters. To get a copy send a money order or check for \$9.95 plus 75 cents first class postage to DX Radio Supply, P.O. Box 360, Wagontown, PA 19376.

As the war drags on other new frequencies

in use will pop up, so I suggest scanning the bands. You never know what you will find.

Well, that's it for this month. I want to hear from you and send me your Desert Storm loggings!



Desert Storm

Top Gulf War Frequencies

Frequency	Description
5.680	ALL MILITARY SAR
5700	TAC OPS
6.750	SCUD WARNING NET
6.761	SAC SIERRA 391
6.697	NAVY HICOM
6.690	RAF STRIKE COMMAND
8.768	NAVY GULF NET
8.972	CRUISE MISSILE OPS
8.993	MAC SCUD WARNINGS
9.011	RAF STRIKE COMMAND
9.014	TAC OPS
11.239	SCUD WARNING NET
11.243	SAC SIERRA 393
11.267	NAVY HICOM
13.182	NAVY P. GULF OPS
13.201	MYSTIC STAR VIP COMS
13.241	MYSTIC STAR VIP COMS
15.035	CANADIAN AF/USAF
15.054	NAVY HICOM

All frequencies USB mode



GULF WAR SHORTWAVE BROADCAST

Station	Frequencies
Radio Baghdad	7.207, 9.570, 11.755, 11.810, 11.830, 11.990, 13.660, 21.585
Voice of Israel	7.465, 9.435, 11.585, 11.605, 11.655, 12.077, 15.090, 15.485, 15.640, 17.575
Voice of Saudia Arabia	9.870, 21.505
Voice of Turkey (ANKARA)	9.445, 17.785, 17.880

Monitoring Times Graphic

Private 2 MHz Frequencies

In both Canada and the United States, single side band (SSB) frequencies are set aside for "private" use. This refers to communications such as those between ships and their operating company or between ships with the same company. Table One is a listing of these upper sideband frequencies showing their uses in both Canada and the United States.

These private ship-to-shore channels can provide some interesting listening since they involve communications relating to the actual business in which the ships are engaged. You won't likely be hearing anyone calling home, but you can hear about operational problems and may learn where ships are. When you find some interesting stations on these frequencies, let me know so that they can be shared with other readers.

VHF Channel 13 on the Great Lakes

Last year a change was made in the use of VHF channel 13 (156.350 MHz) on the Canadian Great Lakes. Now the frequency is used for bridge-to-bridge communications

and ships are required to keep watch on both this frequency and 156.800 MHz, channel 16. Ships wishing to call a traffic control center will still call directly on the center's working frequency; however, the center will now call on channel 16 and then switch to its working frequency.

The effect of this change, for monitors, will be that communications with the traffic control centers will continue on the working frequency; however, calls between ships, and any messages which follow will be made on channel 13.

Books

There are three books which may be useful in keeping track of Great Lakes ships: *The Great Lakes Red Book*, *Greenwood's and Dill's Lake Boats '90*, and *Know Your Ships: The Seaway Issue*.

The Great Lakes Red Book is published annually by Freshwater Press. The main body of the book is organized into two sections. The first is an index to the various fleets operating on the Great Lakes. Organized by

company name, the index gives a list of the ships in the company's fleet as well as the page number where the detailed fleet listing can be found. The fleet listing, itself, gives information about the key officers of the company, or its shipping division, and lists each of the ships, length, beam, depth, number of hatches and cargo capacity.

Unfortunately, the index to vessel names has been dropped from the book. Radio call signs are no longer included either since they accompanied the vessel name in the index. While the book provides useful information about the Great Lakes Shipping fleets, it is difficult to obtain that information without knowing in advance the name of the owner or manager. The 98th (1991) edition is available for \$6.75 + \$1.73 postage and handling from Freshwater Press, Inc., 1700 East Thirteenth Street, Suite 3-E, Cleveland, Ohio, 44114.

Greenwood's and Dill's Lake Boats is also published annually by Freshwater Press and it is organized into seven sections: bulk freighters, package freighters, ferries, crane vessels and cargo barges, self-unloaders, tank vessels, tug and salvage vessels, fleets, and longevity table.

The first six sections are alphabetical listings of ships by their names. Detailed information about the dimensions, capacities and drafts of the vessels are given as well as a fleet number which identifies the owner or manager which is listed in section 7. The fleet listings, arranged alphabetically by company name and giving the names of key personnel, the company's address and lists alphabetically the name of each ship owned or operated. Along with the ship name, the name and place of the builder are given, the date of building the type of vessel and any previous names.

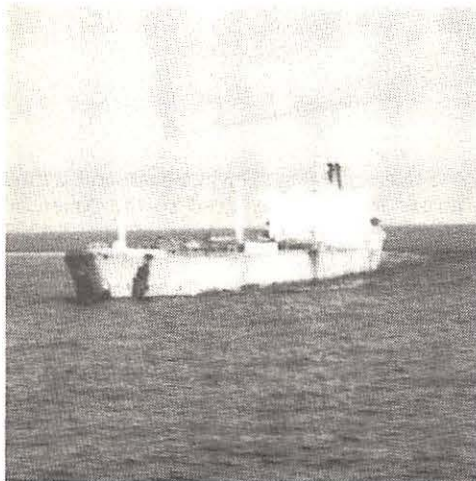
The last section is a longevity table which lists the ships in the order of their years of service on the Great Lakes. The section gives the year of building of each vessel, its name and the type of service which it is in. There are two special sections at the end of the book. The first lists any change from last year, including name changes, scrappings, sales, new buildings, and conversions. The second special section lists the captain and chief engineer of each ship organized by company and then by ship.

TABLE 1

Freq. kHz	U.S.A.	Canada
2065.0	Not used	Ship-shore, East coast and St. Lawrence River East of Montreal
2079.0	Not used	Ship-shore, Great Lakes and St. Lawrence River West of Montreal
2082.5	*1. Intership safety (not Great Lakes)	Intership
2088.0	+ Ship-shore Mississippi R.	Not used
2093.0	Intership	Commercial
	Commercial	East and west coasts
	Fishing (not Great Lakes)	St. Lawrence River
2096.5	Ship-shore not Great Lakes	East of Montreal
2100.0	Government	Not used
2103.5	Government	Government
	Government	Government

*Secondary use is commercial operation communications providing that it does not interfere with the primary use of the frequency

+Secondary use on east, west and gulf coasts subject to noninterference to primary use. Not available on the Great Lakes.



Rachel Baughn

This book also offers a listing of Great Lakes ships, and adds ocean-going freighters which trade on the lakes. The main body of the book is divided into two parts: an index of ship names indicating to which fleet a given ship belongs; and a listing by fleet which gives the name of each ship, her type, year built, an indication of cargo capacity or registered tonnage, the type of engine and the length, beam and draft of the ship. It is also liberally illustrated with color and black and white photos of ships as well as a seven page color chart showing stack markings.

This information has previously been included in *The Great Lakes Red Book*. The 1991 edition is available for \$6.75 + \$1.73 postage and handling from Freshwater Press, Inc., 1700 East Thirteenth Street, Suite 3-E, Cleveland, Ohio, 44114.

Know Your Ships: The Seaway Issue is published by Marine Publishing Company.

While it is not as comprehensive in the number of Canadian and U.S. ships which it lists, *Know Your Ships* does include numerous foreign ships. Because of this, it is indispensable to anyone interested in shipping on the Great Lakes, St. Lawrence River, or even the Atlantic coast of Canada and the northeastern United States. The 1991 edition is available for \$8.25 from Marine Publishing

Company, P.O. Box 68, Sault Ste. Marie, Michigan 49783.

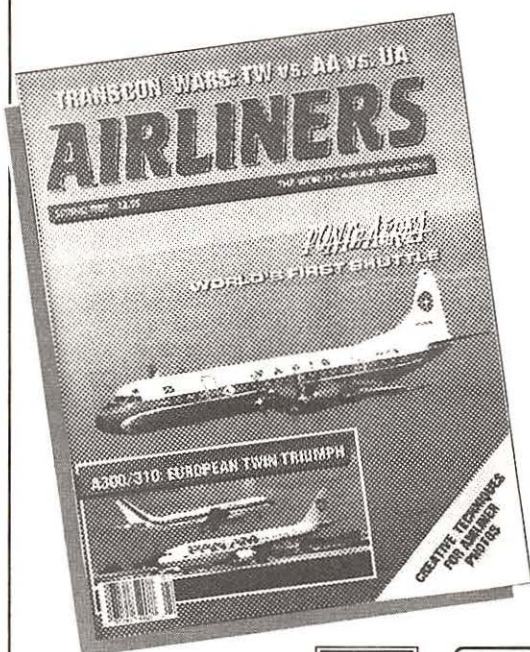
From the point of view of the information included and the ease of use of the books, *Know Your Ships* and *Greenwood's Lake Boats* are good buys for those keeping track of Great Lakes and eastern Canadian and U.S. shipping.

Frequency Plan Changes

Effective July 1, 1991, the International Telecommunications Union will be changing many of the frequencies used by the maritime mobile service. In the January issue of *Monitoring Times*, Ev Slosman wrote an indispensable update on these changes. In May, we'll take a look at what adjustments ships, coast stations, and the maritime shortwave listener will have to make. Until then, good listening.



You've heard it on the Airwaves, now read about it in



AIRLINERS

THE WORLD'S AIRLINE MAGAZINE



Tune in to all the behind-the-scenes action in **AIRLINERS**,

the only magazine solely dedicated to the exciting world of airlines and airliners, past, present, and future. A top-quality quarterly featuring stunning color photography, **AIRLINERS** is packed with lively and authoritative feature articles about airlines, planes and people, from Alaska to Zimbabwe, from STOL to supersonic. We tell you the way things work (or don't work!), take you on air travel adventures, and let you share the humor of the airline world.

Only \$14.95 a year (4 issues) from **AIRLINERS**, Box 52-1238
Dept ST Miami, FL 33152-1238 (305) 477-7163. FAX (305) 599-1995
VISA/MC accepted. Or for sample copy send \$4.95.



Hot Sounds in the Desert

**KAYN
THE HOT FM
98.3**

The desert isn't the only thing that's hot in Arizona. If you are heading toward Mexico from Tucson your radio will heat up, too. Just tune to 98.3 FM for Hot Hits KAYN in Nogales. Tired of bland radio across the country? This station is radio's answer to a jalapeno pepper.

It could be called a program director's dream come true. Picture yourself in a situation where you operate the only radio station in your market. There are a few stations on AM, but they are across the border pumping out Mexican romantic and ranchera music. You are free to experiment with whatever you please and whatever your audience will tolerate. KAYN doesn't abuse the privilege. They cultivate it to its maximum potential.

Hot Hits 98 breaks records. No, they aren't converting to all CDs and destroying their vinyl. And they're not showing up in the *Guinness Book*, but they are working on it.

KAYN is one of the few stations in America that takes chances with their music and plays new records weeks before they begin to climb the charts. It's leading the pack as an Adult Contemporary break-out station.

Publicity Director David Fouch is excited about KAYN's role in creating hits. "A record label, like Warner Brothers, will ship us a new release like Quincy Jones' new single 'Places You Find Love.' They'll ask us to try it out down here. If our program director, Bob Gerhard, feels that it's viable, he'll play it. If it's popular we'll put it on our 'Add List.' We probably get 20 to 30 calls every Monday or Tuesday from various reporting agencies in the industry asking us what we've added.

When this station plays something and it goes on our Add List, then the record labels feel confident that they can go to New York or Chicago or other major markets. They can say, 'Here's something that works. It's viable.' But we're the ones that get the awards. We believed in it before anyone else did. Basically, we're a marketing testing ground."

When it comes to picking new hit records, Bob Gerhard has a great track record. The walls of the station are covered with platinum and gold record awards from artists thanking KAYN for giving them their first break. When the world had no idea who Tracy Chapman and 10,000 Maniacs were, KAYN had been playing their records for months.

Bob doesn't mind relying on his judgment. "One of the things I like about the evolving hot AC format is that it is adventurous, and one of the things I like about a small market is that you can afford to be a little adventurous. If something's not going to work, you're going to find out about it a lot quicker than you will in a

large market where you're going to have to wait for the research to show it to you."

KAYN's mix is 50 percent current hits, 30 percent recurrent recent songs and 20 percent oldies from the contemporary hit radio charts of the 1980s. You'll hear everything from Phil Collins to Judy Collins.

Gerhard and his staff know their audience and their needs. "The people who work here are a part of the community and have grown up or lived in the community for years. They have a definite feel for the fairly unique cultural situation here, and it's a definite plus. We tend to take an aggressive stance with new music. We like to think of ourselves as a sort of an adult-g geared progressive music station."

Holding down the 6 to 11 a.m. morning drive shift on KAYN, Bob gets first-hand feedback from his audience. "When you're in a small market, you're it. You've got the news to take care of, the weather, the music, the whole bit."

KAYN has only three full-time disk jockeys, all filled with youthful energy. Bob used to be the youngster at the station, becoming the program director at age 20. Now 27 years old, he's a senior citizen, but is representative of the town's youthful air.

Although it's in a remote location on the border of Mexico and Arizona, Nogales is no ghost town. Nogales is the biggest entry point of fruits and vegetables in the country, and the city is lined with produce brokers and warehouses. Many manufacturers use Nogales as the base for their maquiladoras. These businesses maintain their offices in the states and operate factories across the border where labor and assembly costs are much lower. Maquiladoras and the produce industry make Nogales thrive and their radio station follows.

Hot adult contemporary music is not all you'll hear on KAYN. "We do five minutes of news every hour, and that comes off the Sat News news service out of Washington D.C. We find that it is very accurate and is quick or quicker than anything we could subscribe to." KAYN also broadcasts daily stock market reports and a unique sports program, "The Commissioner Landa Report," with George Landa. Landa's popular voice and commentary sounds like it comes from a cross between a tough football coach and an angry pirate.

Each week Hot Hits 98 also presents "American Top 40" and "The U.K. Chart Attack," along with "Alternate Route," a locally produced post-modern new rock show, and KAYN's "Saturday Night Power Mix" that features the latest and hottest dance and rap music. From noon to 1 p.m. every weekday "Gold" is on the air with all-request oldies from 1945 through 1980.

Friday mornings David Fouch and station owner Rich Heatley head to the American Hotel for a live broadcast of the KAYN "Breakfast Club." "It's a forum and a sounding board for community events and action," says Fouch. "We make ourselves available to anything that's happening in the community."

Public service is an important ingredient at KAYN, and the station tries to provide for every local resident. Nogales has a huge Hispanic population, north and south of the border, as you would expect. Bilingual commercials can be heard throughout the day. At midnight, KAYN becomes Radio Caliente (Hot Radio) independently produced by area resident Jorge Berny. Mexican stations south of the border are all off the air by midnight, so the program is in great demand and draws a huge following. This six hour overnight show is exclusively in Spanish and features the best in Mexican recordings.

Hispanic listeners don't leave at 6 a.m. David Fouch's research has shown that they listen during the day, too. "The Hispanics find that hot hits are something they want to listen to because there is no alternative to Mexican music. We get a lot of people down there who listen to American things. The same thing holds true for their buying and everything else. These folks are very quality conscious and they have disposable income to spend. That's why they come across the border and spend their money in Nogales."

The broad range of listeners that KAYN serves is very important to them, and they aren't afraid to involve themselves in mutual support. Bob Gerhard remembers "Arizona, and especially our community, were hit really hard in the mid 1980s by the peso devaluation in Mexico, and our economy just dried up overnight. That summer we pulled together all the merchants in the downtown district which is right across the border. We had a giant sidewalk sale. We closed off the streets, organized the sale and moved a million dollars worth of merchandise in a three day period.

"We did it annually for three years and every time it just got bigger and bigger. That provided us with an invaluable image with the merchants in that area." KAYN did numerous remotes from stores and began a "Buy Nogales" campaign stressing patronage of local businesses. "We're a part of the community. You listen to us. Why not expand that hometown loyalty and stay in your hometown? Don't take your money to Tucson," one message preached. The program was very successful and the economy's health began to improve.

"We're right on the cutting edge of new music in the adult contemporary vein. We are

Be an American BandScan Reporter.

See any stories about radio in
the local paper? Send them to
Monitoring Times, P.O. Box
98, Brasstown, NC 28902.

the only viable advertising
vehicle in Santa Cruz

County. We are progressive. We have a creative family-type staff. We're the kind of people who like to have fun with what we do. We're in a unique position, so why not have fun? If we had competition, it probably wouldn't hurt us a bit," claims Fouch. "We'd welcome it. It would just whet our appetite."

Bits 'n' Pieces

■ Almost everyone listens to radio, but if you listen to AM, you're probably over 55, according to two recent audience surveys. RADAR and Arbitron discovered FM radio is now preferred by all age groups, including those over 55 years old, a first. Adult contemporary, Top 40, and News/Talk are now the most popular formats in our country, followed by album oriented rock, country, and urban contemporary. Seventy-seven percent of all Americans are reached by a radio network every week, and during an average quarter hour period, 24 million people are listening to their radios. ■ Thousands of people listen to 91.3 FM every day to enjoy programming produced by the University of Kentucky in Lexington. Entwined into their signal is another broadcast that can only be heard with a special receiver. A group of volunteers read their local newspaper, *The Lexington Herald-Leader*, to blind listeners over a subcarrier of WUKY-FM for two hours daily. The service is available to anyone who cannot read a newspaper and is within the signal coverage area of the station. For more information call The Central Kentucky Radio Eye at 606-257-2702 during business hours.

New Station Grants

Spring will be here soon, and so will these new stations: Window Rock, AZ 96.1; Yuma, AZ 88.1; Salem, IN 97.9; Reserve, LA 94.9; Marion, MA 88.5; Orange, MA 97.3; Webster, MA 98.9; Saginaw, MI 104.5; Ashland, MO 106.1; Malone, NY 96.5; Altoona, PA 1340; Bloomington, TX 106.9; Hamby, TX 880; Eau Claire, WI 91.3; Mosinee, WI 94.7; and Kingwood, WV 107.9. Window Rock, Arizona, will be home of a 100 kW station owned and operated by the Navajo nation. Altoona, Pennsylvania's new station on 1340 kHz and WTRN in nearby Tyrone will operate on the same frequency using an unusual synchronous transmitter system to increase WTRN's coverage. Courtesy of the *M Street Journal*.

For Sale

An excellent first station for someone who wants to get started in radio is being offered in Danville, Kentucky. This 1000 watt AM facility

with a directional antenna
array is only 30 miles from

Lexington and ready for your management. It's priced under \$100,000, and currently has a positive cash flow. Call 502-879-8190 for more information.

Central New York is the home of a Class A FM ready for immediate purchase. It services an upscale market of 160,000 people and is being offered for \$400,000 with seller financing possible. Contact John Robshaw at 716-633-4030.

If Oklahoma sounds like a better place to call home, consider another Class A FM station for sale for \$99,500. With nearly new equipment, KRMK in Cordell has a long lease on its studio and transmitter tower site and is seeking a new owner/operator. Call Joyce Erway at 407-283-6871.

International Bandscan

■ All news is big news in France where a new nationwide radio network is attracting attention and listeners. Twenty-four hours a day, France Info presents its commercial-free all-news format to 97 cities on 105.5 MHz FM. The state-owned operation concentrates on worldwide and national news, along with short features about the stock market, gardening tips, traffic, weather, and more. Almost 70 percent of their audience is under 35 years old, and its ratings continue to soar. With 50 journalists and 25 engineers, France Info has established an excellent reputation for covering international events with depth and insight unseen on other competing networks. ■ Utvarp Foroya, the radio service of the remote Faroe Islands, is now using a powerful 200 kW transmitter on 531 kHz and has expanded its programs in English for seafarers beyond their familiar news and weather bulletins. Look for them from 0800 to 1000 UTC after the Swiss transmissions on this frequency fade in your area. ■ Radio Finland is now using 252, 558, and 963 kHz for broadcasts in English at 0000, 0730, 1500, 1930 and 2200 UTC. ■ Egypt's Voice of the Arab service is now being relayed to Egyptian armed forces in Saudi Arabia on 1575 kHz with a 50 kW transmitter located in Sharjah in the United Arab Emirates. ■ Great Britain has begun plans to phase out medium-wave transmissions of BBC Radio 3 on 1215 kHz and BBC Radio 1 on 1089 and 1053 kHz to make room for two new commercial networks who have just been awarded franchises. Another commercial network will occupy FM frequencies providing a music format other than pop or rock providing programming diversity in the eyes of the British government.

Credits

Thanks to the *New York Times*, *The M Street*

CHANNEL CLEANER™

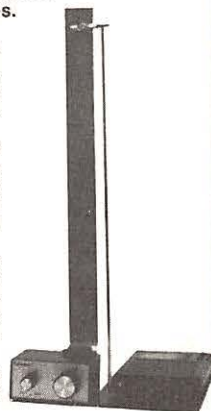
- New reception principle.
- Reduce interference 15-30 dB.
- For small portable radios.

Bugged by interference?
Two stations on one frequency and you can't understand either one? Splatter? Heterodynes?

Channel Cleaner™ solves these problems. Simply place your radio on Channel Cleaner's platform. Tune Channel Cleaner™ and rotate it to null out the interference.

Channel Cleaner™ makes a directional radio frequency shadow that shades your radio's antenna from the interference. Reception in all other directions is normal.

Experience this exciting new development. Order your Channel Cleaner™ today.



Model PA-420 Channel Cleaner™ \$79.95 + \$4 shipping/handling in U.S. & Canada. California residents add sales tax.



Send for FREE catalog that shows our complete line of antennas, preamplifiers, and filters.

PALOMAR ENGINEERS

BOX 455, ESCONDIDO, CA 92025
Phone: (619) 747-3343

RADIO TESTS

Below are several tests arranged by the National Radio Club. If you'd like more information on NRC and BCB DXing please send \$1 to the National Radio Club, P.O. Box 118, Poquonock, CT 06065.

KTIB-640, Box 682, Thibidoux, LA 70301 will conduct a special DX Test on Monday morning March 11, 1991, between 0200-0400 EST. This test will include Morse code ID's. Thanks to Ray Saadi, General Manager, for this test.

KTGG-1540, Spring Arbor College, Spring Arbor, MI 49283 will conduct a special DX Test on Saturday morning March 23, 1991, from 0430-0500 EST. Thanks to Edmond R. Trombley, Chief Engineer, for this test.

73 Jeff Tynan & Wayne Heinen for the Colorado CPC Machine.

Journal and Broadcasting magazine, the British DX Club, and readers Ron Carruthers, W. Earle Doan, Andrew Steinberg, Edward Biebel and Lt. M.L. Cauthon III and everyone at KAYN-FM Nogales, Arizona.

Until next month, happy trails.



A Busy Year Ahead in 1991

The beginning of a new year is always an active time in the world of satellite television. One reason is that often transponder use contracts are tied to the beginning of the month. Also, services which are planning to launch, either announce plans or begin testing their service at the first of the year. Let's take a look at how 1991 is shaping up.

Demise: Announced and unannounced

Mizlou Communications Corporation, operators of the Sports News Network (F4,2) gave affiliates only a few hours' notice before pulling the plug on their service. Struggling to survive until their first birthday, SNN spent the last few months looking for a backer with deep pockets. The only apparent taker was Landmark Communications, owner of the Weather Channel. When the two couldn't agree on a price, the money ran out and Mizlou Communications was said to be filing for bankruptcy.

Also on the auction block with no apparent takers was Drive-In Cinema (G2,21) part of the Graff pay-per-view empire. Slated to go dark Feb. 1, Drive-In first debuted on S2,1 at the same time Graff debuted Rendezvous, its adult movie service. Since the start in 1989, Rendezvous became Spice and moved to F4,18 and became encrypted in the VCII Plus mode. Graff bought the Cable Video Store from Forstmann Little & Co. who had just purchased General Instrument, maker of the VideoCipher II encryption system. Graff then moved CVS to F4,4.

Finally, Starion Premiere Cinema, a TVRO only premium movie channel owned by Amway and United Video ceased transmissions on Jan. 31. Starion has struggled to get subscribers to its VCII encrypted channel in the face of rampant VideoCipher piracy (the practice of illegally modifying VCII decoders to receive subscription channels for free). In addition, the company fought a losing battle against exclusive movie presentation rights which its competitors, HBO and Showtime, enjoyed.

Merged

After nearly two years in a very unfunny sniping war, Time Warner's The Comedy Channel and Viacom Inc.'s HA! will cut their losses and merge, possibly this month. It's not that there weren't enough ad dollars to support both, it's more that channel space on the nation's cable systems is filled up. It's a

classic example of the inadequacy of the whole idea of a cable technology. In a satellite delivered market, there's plenty of room.

Scanning the horizon

In spite of the problems for all of the above named, there is a long line of people with cash in hand ready to jump into the same abyss. Some of these networks like American Courtroom Network and In Court merged before they ever began production. They are now Courtroom Television Network and will begin a part-time life on F3,24 sharing the channel with Bravo which takes over at 8 p.m. ET.

The Dec. 3, 1990, issue of *CableVision* magazine listed the following proposed channels and their hoped for launch dates:

Cable Television Nacional	First quarter 1991
Career Television Network	First quarter 1991
Celticvision	March, 1991
Channel E	1991-'92
The Chiller Channel	1991
The Cowboy Channel	First quarter 1991
Digital Music Express	First quarter 1991
Digital Planet	First quarter 1991
The Food Channel	1991-'92
Global Village Network	Second quarter 1991
Golden American Network	April, 1991
The How-To Channel	Second quarter 1991
The Monitor Channel	May, 1991
The Sci-Fi Channel	First quarter 1991
Talk Television	1991
Talk Television Network	April, 1991
Viva Television Network	First quarter 1991
Vision Television	Second quarter 1991
World Television	1991

Channel hopping

As mentioned, the PBS network feeds which had been on Westar 4 since its launch have moved to Spacenet 1. Other residents on W4 appear to be staying. Happily, the BBC Six O'Clock news is still on W4, but has moved two channels up to transponder 12. Look for this excellent live national news program from Great Britain at 1 p.m. ET. It is an excellent news source especially in this time of world tension. All SCPC audio services have also stayed with W4 including NPR radio network feeds.

Turner Network Television (TNT) currently on F3,18 will swap transponders with The New Inspirational Network which is currently on Galaxy 1,17. The changeover will

take place over a period of nearly a month and will be finalized by early this month.

Satellite hopping

In a move that showed an unusual sense of the future, GE Americom, the company that launched F1R (139 degrees W.), had stowed away on the ground another copy of that satellite which it called C1. The "advanced Satcom" satellites, built by RCA, are well-designed birds which have given excellent service. Problem is that GE Americom has some really powerful birds in the offing and it seemed that if they were to get any use out of their spare C1, they had better get it out of mothballs and into the Clarke Belt.

So it was that back on Nov. 21, 1990, C1 was launched on an Ariane rocket and by Jan. 9 they had maneuvered C1 to the same location as F1R and switched all the programming. They then trotted F1R, a newer bird by two years, over to F3R at 131 degrees west to transfer all programming from F3R to F1R on Jan. 31. F3R was then finally decommissioned and a very big improvement in signal was appreciated by all. This is because F3R had only six transponders of 8.5 watts. The others, and you may have noticed that some of the channels didn't seem to be as crisp, had 5.5 watts. In addition, transponder 21, former home of the Weather Channel, was completely dead. In fact, F3R is said to have had five unusable channels.

That is not the end of the satellite shell game. GE will launch, in May of this year, C5 which will take the place of C1. C1 will take the place of G1 and it gets too confusing from there. The one thing that is certain is that 1991 will go down as perhaps the busiest year for satellites since 1983 when many of the current birds were first launched.

Audio subcarrier changes

Yesterday USA Superstation, the old time radio station which features 24 hour/day radio shows from the golden age of radio is now available on Galaxy 3 transponder 7 on 5.76 MHz in addition to its old locations F4,15, 6.20 MHz and F4,21, 6.20 MHz.

Legislative and consumer affairs top the program on Chuck Dawson's new C-SAT

program on Chuck Dawson's new C-SAT program "News and Views." The program airs Mondays at 9 p.m. and Wednesdays at 11 p.m. ET on S3, 9, 6.80 MHz audio and follows his other show "Dealer To Dealer."

FCC Clears Bridge to HDTV

Faroudja Research Enterprises has developed a system of broadcasting an enhanced NTSC standard signal via an over-the-air transmission they claim offers a picture with the appearance of 1050 lines per screen as opposed to the 525 in the current NTSC standard. This is said to give higher resolution to details now missing in our TV pictures. In addition, the system is said to deliver compact disc quality sound.

Calling it SuperNTSC, Faroudja has been given clearance by the FCC to begin testing its system in real-life conditions. It will do so by using the system for tests of one week long in each of five cities around the country.

Those cities are said to be Boston, San Francisco, Washington D.C., Philadelphia and Bergen County, N.J. If the system proves successful and is adopted by broadcasters or cablecasters, it will likely take two years or more to deliver the hardware. Present estimates suggest consumers would be asked to pay \$200-\$350 extra for Faroudja electronic components which would be built into TV sets and decode the SuperNTSC signal. Non-equipped sets would not notice any difference in the signal and viewers would see the old NTSC picture.

Mailbag

E.R. Salisbury of Parker, Colorado, sent a clipping from his local newspaper which features an advertisement from a company in Houston, Texas. The ad offers "the world's smallest TV satellite receiver approximately 12 inches in diameter . . ." It goes on to talk about receiving 120 free channels, premium movies and more. All for under \$85. The ad also says they'll send a catalog etc. for \$5.95. E.R. Salisbury says: "... being brought up with the motto 'Caveat Emptor,' I'm a little dubious about the claims . . ."

Your instincts appear to have been right on the mark. A piece in the *Satellite Business News* mentions the very same ad. They apparently attempted to contact the company listed in the ad with these results: "... (the) phone at (the) company rang unanswered for weeks and was then disconnected in mid-December."

While the progress of technology in the satellite communications industry has made great advances, it is unlikely that there will be a "miracle breakthrough" that will allow us to

enjoy satellite TV for under \$85. It is possible, however, for people to piece together real satellite systems using used or older outmoded equipment that will last for years for as little as a few hundred dollars.

Ed Flynn of San Rafael, California, says that he's been a monitoring hobbyist for about 35 years . . . "Now I am thinking seriously of getting into satellite TV and would like some information . . . Could you recommend some book on the basics: what's available, the costs, what's coming . . ." Ed already has a listening post crammed with some world class gear with an interest in receiving data.

Ed, I'd like to recommend my own book, *Satellite Television Sourcebook* (\$20 ship/incl from Xenolith Press, Rt 5 Box 156A, Louisa, VA 21093), which should help you with all those questions. There are a number of other books which you may enjoy as well. Among them are: *Home Satellite TV Installation and Troubleshooting Manual* by Frank Baylin, Brent Gale, and Ron Long. This book is available for \$33 direct from the publisher, Baylin Publications, 1905 Mariposa, Boulder, Colorado, 80302. The *World Satellite Annual* by Mark Long can be ordered from Transponder Book Sales, 800-002-3488 or write P.O. Box 460, Salamanca, NY 14779, price is \$43.50. Also available are a number of publications from the STV Bookstore. Call them for a list: 800-234-0021 or write STV Bookstore, P.O. Box 2384, Shelby, NC 28151-2384.

Bruce Backlund of Sag Harbor, New York, writes that he has been trying to find UPI or AP RTTY via satellite without success. "... using the baseband video output fed into a Kenwood R-2000 . . . I hear a lot of telephone and some fax on T2 and S3 but no news service RTTY. . . Also using my ICOM R-7000 I receive about a hundred wideband SCPC services including AP and UPI Network audio on G2, S3 and W4, but again, I never hear any RTTY. I think it's there using Frequency Division Multiplex but I don't hear any buzz saw noise as I do on regular High Frequency radio. . ."

Bruce, according to reports from AP, all their digital services are on Spacenet 3. However, I wouldn't be surprised if their RTTY data stream contains a proprietary encryption code. The best source I know for recent information on FAX and RTTY via domestic satellite is *The RTTY Listener*, Issues 1 through 20. Edited by Fred Osterman, it's available from Universal Radio Research, 1280 Aida Drive, Reynoldsburg, Ohio, 43068. Price is \$20. According to *The RTTY Listener*, UPI FAX is found on K-2 transponder 14. No word on RTTY.

mt

Improve Your World Image



PC HF FACSIMILE 4.0 \$99

A complete facsimile reception system for the IBM PC or Compatible. Receives up to 16 intensity levels.

Includes:

Demodulator 80 Page Manual
Software Tutorial Cassette
Frequency List Interpretation Guide

Features:

Print on Epson, or HP Laser Jet
Disk Save, Zooming, Image processing
Unattended Image Capture and much more

PC GOES/WEFAX \$250

Designed to receive images directly from U.S. and Soviet meteorological satellites. Includes all of the above feature plus a complete orbital tracking system and resolution of up to 256 gray levels.

Software Systems Consulting

150 Avenida Cabrillo, "C", San Clemente, CA 92672
(714)-498-5784

THERE IS NO EXCUSE FOR PAYING TOO MUCH

Free shipping on all prepaid orders.

ALL NEW '91 CATALOG !

Only \$2

SCANNER MODS FOR PRO2004, 2005, 2006,
PRO34, BEARCAT 200, 205, 760, 950
Call For Pricing !

Midland VHF Portable Weather Radio
AUTOMATIC ALERT, List \$79 SALE \$32
New ! Ranger RCI1000 VHF Mini-HT
2 CH, 1 WATT List \$197 SALE \$150
New ! Regency INF 10 Mobile Scanner
W/TURBO SCAN II List \$209 SALE \$119
Bearcat BC170 11 Band Base Scanner
W/AIRCRAFT, List \$189 SALE \$109
UNIDEN BEARCAT BC200 XLT Scanner
12 BANDS, FREE MODS, . SALE \$255
COLT CP1000 Cordless Phone
3 YEAR WARR. List \$99 SALE \$50
New ! AE3 VOX Transmitter Kit
49 MHz CRYSTAL CONTROLLED \$45

INTERCEPT INC.
6014 OAK HILL DRIVE
FLOWERY BRANCH, GA 30542
PHONE (404) 967-9757

TELL THEM YOU READ IT IN THE
MONITORING TIMES!
ADVERTISERS WANT TO KNOW.

AIRCRAFT TRAFFIC

Maryland Natural Resources Police-N6266X, (61' Aero Commander 500 A aircraft) 156.8/156.45 MHz. Full data letter and photo of aircraft. Received in 18 days for an English utility report and U.S. mint postage. Aircraft address: c/o Natural Resources Police, Tawes State Office Building, Annapolis, Maryland, 21401. (Hank Holbrook, Dunkirk, MD)

U.S. Army aircraft 22940 (C-12-C Beech) 18019/20390 MHz. Full data prepared card, verified by James P. Gann, maintenance corps. Received in nine days for an English utility report. Aircraft address: c/o Commanding Officer/Army/A/c #22940, Airfield Operations Detachment, 743 Ray Place, Ft. Riley, Kansas, 66442-5959. (Bill Battles, E. Kingston, NH)

ANTIGUA

Deutsche Welle Relay, 6040 kHz. No data QSL card, without verification signer. Received in two months for an English report and one IRC. Station address: Postfach 10 04 44, D-5000 Köln 1, Fed. Rep. of German. (Fraser Bonnett, Fairborn, OH)

BELGIUM

BRT International, 9925 kHz. Full data QSL, without verification signer. Received in 178 days for two English reports. Station address: P.O. Box 26, 1000 Brussels, Belgium. (Nicholas Adams, Newark, NJ.)

CYPRUS

Cyprus Telecommunications Authority, 8737.5 kHz. Full data QSL letter, verified by manager engineering resources and technical services. Also received a two-page station information enclosure. Received in four months for an English utility report and two Cyprus mint stamps. Station address: Telecommunications St., P.O. Box 4929, Nicosia, 142, Cyprus. (Larry Van Horn, New Orleans, LA)

GREECE

ERT Voice of Greece, 9420 kHz. Full data scenery card, without verification signer. Received in 30 days for an English report and one U.S. dollar. Station address: ERT S.A., Director of Technical Services, P.O.B. 60019, 153 10 Aghia Paraskevi Aptikis, Athens, Greece. (Robert Landau, Secaucus, NJ)

INDIA

All India Radio, 11620 kHz. Full data card, with illegible signer. Received in 81 days for an English report and one IRC. Station address: The Director External Services Division, P.O. Box 500, New Delhi 11001, India. (Adams, NJ)

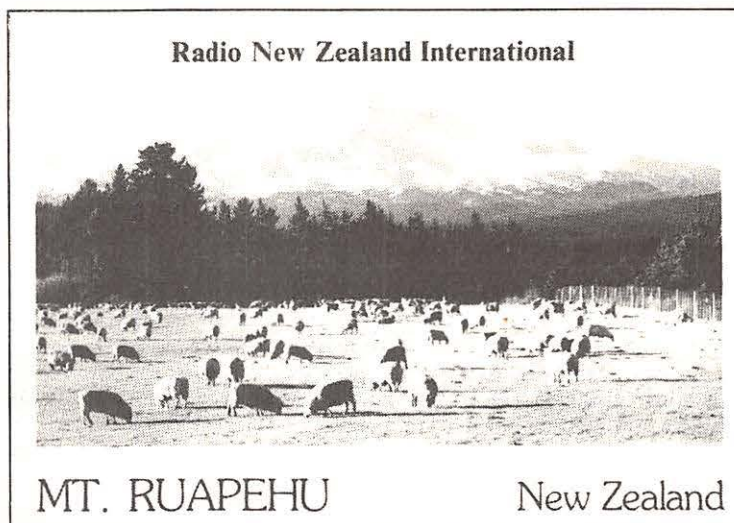
NEW ZEALAND

Radio New Zealand International, 17675 kHz. Partial data QSL card, verified by Rudi Hill. Received in 18 days for an English report and three IRCs. Station address: P.O. Box 2092, Wellington, New Zealand. (Bonnett, OH)

PIRATES

Radio Free Oz, 7410 USB. Full data cartoon card and paper pennant, verified by Howard E. Lyon. Received in 21 days for three U.S. mint stamps. Station address: P.O. Box 452, Wellsville, NY 14895. (Harold Frodge, Midland, MI)

Radio Free Massachusetts, 15050 kHz. Full data QSL and letter verified by H.V. Short. Received in 25 days for an English report and U.S. mint stamps. Station



John Flake of Charlotte, North Carolina, sent in this scenic QSL from Radio New Zealand; Fraser Bonnett of Fairborn, Ohio, also reported having received a verification card from the station.

address: P.O. Box 109, Blue Ridge Summit, Pennsylvania, 17294. (Bonnett, OH)

One Voice Radio, 7214 kHz. Full data foot-face card verified by Joe. Also received a personal "foot" note and T-shirt order form. Received in 26 days for an English report and three U.S. mint stamps. Station address: P.O. Box 109, Blue Ridge Summit, Pennsylvania, 17214 (Frodge, MI)

Pirate Radio New England, 7415 kHz. Full data QSL card and letter, without verification signer. Received in three months after second report and U.S. mint stamps. Station address: P.O. Box 40554, Washington D.C., 20016. (Bonnett, OH)

Voice of Monotony, 7415 kHz. Full data QSL letter, signed by Uncle Salty. Received in two months for an English report. Station address: P.O. Box 109, Blue Ridge Summit, Pennsylvania, 17294. (Bonnett, OH)

PORTUGAL

Radio Portugal, 9705 kHz. Full data QSL card, without verification signer. Received in 35 days for an English report, two IRCs, and mint stamps. Station address: Radiodifusao, Portuguesa, Rua S. Margal 1, 1200 Lisboa, Portugal, (Norman P. Anderson, Santa Ana, CA)

SEYCHELLES

FEBA, 15325 kHz. Full data map card, verified by M. Asba-QSL secretary. Also received sticker and program schedule. Received in 63 days for an English report and three IRCs. Station address: Box 234, Seychelles, Indian Ocean. (Landau, NJ)

SHIP TRAFFIC

HARVEY GAMAGE-WYS-2951 (95' auxiliary schooner), 156.8/156.45 MHz. Full data prepared card. Received in 21 days for an English utility report and U.S. mint stamps. Ship address: c/o Dirigo Cruises, 39 Waterside Lane, Clinton, Connecticut, 06413. (Holbrook, MD)

USCGC CONFIDENCE-WMEC-619 NHKW, 156.8 MHz. Full data prepared card. Received in 10 days for an English utility report and U.S. mint stamps. Ship address: c/o Patrick AFB, Coco, Florida, 32925-5000. (Holbrook, MD)

STAR LOUISIANA-C6BK (tanker), 500 kHz. Full data prepared card. Received in 37 days for an English utility report and U.S. mint stamps. Ship address: c/o Texaco Inc., 2000 Westchester Ave., White Plains, NY 10650 (Holbrook, MD)

STAR GEORGIA-WLDW (tanker), 500 kHz. Full data prepared card. Received in 20 days for an English utility report and U.S. mint stamps. Ship address: c/o Texaco Inc., 2000 Westchester Avenue, White Plains, New York, 10650. (Holbrook, MD) *This ship was previously the TEXACO GEORGIA-ed.*

MORMACSTAR-KGDF (tanker), 500 kHz. Full data prepared card. Received in 19 days for an English utility report and U.S. mint stamps. Ship address: c/o Moore McCormack Transport, 3 Landmark Square, Stamford, Connecticut, 06901. (Holbrook, MD)

SWEDEN

Radio Sweden, 11705 kHz. Full data scenery card, verified by Wilam Von Amaed. Received in 32 days for an English report. Station address: S-105 10 Stockholm, Sweden (Adams, NJ)

UNITED STATES

USCG COMM. STA. Miami, Florida 5696.0 kHz. Full data station logo card and sticker verified by RMC Thomas L Chirhart, and personal note. Received in eight weeks for an English utility report. Station address: 16001 SW 117 Ave., Miami, Florida, 33177. (Jeff Mallowney, Richardson, TX) (Russ Hill, Oak Park, MI)

WBLL 1390-AM Bellefontaine, Ohio. Partial data letterhead report, signed by Bill Appel, program director. Received in five days for an English report and a self-addressed envelope. Station address: 1501 Rd. 235, Bellefontaine, Ohio, 43311. (Frodge, MI)

WNIS 850-AM Norfolk, Virginia. Partial data letterhead report, verified by Pat Murphy, operations manager. Also received station souvenirs. Station address: 500 Dominion Tower, 999 Waterside Drive, Norfolk, Virginia, 23510. (Frodge, MI)

WDOC 1310-AM Prestonsburg, Kentucky. No data memo, signed by Gorman Collins. Also received a partial data letterhead report from Bob Williams, C.E., and station souvenirs. Station address: P.O. Box 309, Prestonsburg, Kentucky, 41653. (Frodge, MI)

VATICAN STATE

Vatican Radio, 11725 kHz. Full data QSL card, without verification signer. Received in 92 days for an English report and two IRCs. Station address: Vatican Radio, Vatican City. (Anderson, CA)

NextDay™ Reception Reports

Two-Color Printing
Rainbow Cardstock

100 200 300
\$19.95 \$24.95 \$29.95

Specify • Receiver
• Antenna
• Your 40-Word
Personal Message

• Command Attention • Send Clear Reports • Speed Replies • Save Time •
Box 50062-M • Provo, UT 84605 • **AntennasWest**

DSP Revisited

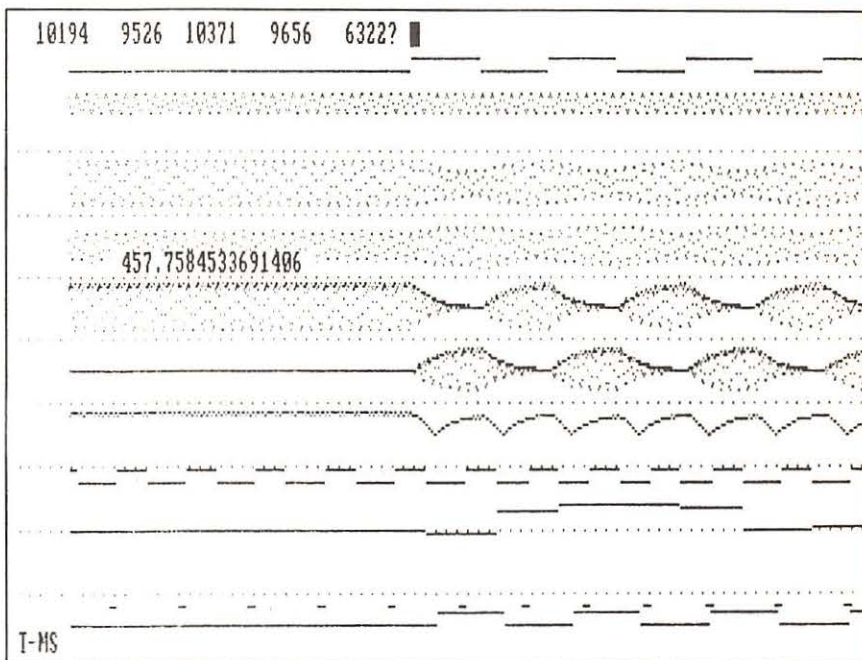
Several months ago you were introduced to a new technology called DSP (Digital Signal Processing). Now I'm happy to report that *Monitoring Times* will be at the forefront of this new technology.

An engineer and myself have developed a printed circuit board that plugs into the expansion slot of an IBM or IBM compatible PC/XT. It can interface to an "All Mode TNC" or any radio modem such as the M7000 or M6000 or it can turn a PC into a stand alone radio modem. It will have all mode capabilities including Piccolo and other multitone modes. It can also serve as a tuning scope or as an audio spectrum analyzer. As we develop new software we will be able to load in new modems from a floppy disk and trim the filters to our liking.

A DSP can do all of the above because it doesn't have filters as we know them. It's not a circuit with resistors, capacitors or coils. It's actually a microprocessor like the one in your computer. It's a special processor that is designed to perform mathematical equations and it can solve them at lightning speeds. In fact, it solves the problems so quickly it can do it in a fraction of a second.

In electronics, any electrical circuit can be defined by a mathematical equation. You can use Ohm's Law, for example, to calculate voltage in a resistor divider. You can even use your computer to calculate it. All that you need to do is write a program using Basic language and apply the equation to the program. When the equation is applied to the DSP program, the DSP can simulate the same circuit.

The engineer who is developing the DSP software runs a Basic program on his home computer that simulates an RTTY decoder using mathematical formulas. He can display what looks like a six trace digital storage



An actual computer simulated RTTY decoder

oscilloscope on his computer monitor. The only problem is, the Basic program can't run in real time (real time means it runs fast enough to keep up with the RTTY signal). If the program works, he then converts it to the DSP language and then it runs in real time.

If you could see the DSP in operation you would be amazed. I already have one installed in my PC. I can, for example, load in a filter program from a floppy disk. Once it's loaded, the DSP does its job. There are connectors in back of the computer on the DSP board that connect to my ICOM R71A's audio out jack. The audio is processed and then sent to the data out jack that is also on the rear of the computer.

I can connect the data leads to my Universal M7000 which by-passes the internal filters. The DSP can replace the audio circuits in the M7000 with ones that are not available such as a Piccolo or multi-tone modes.

It will also work with a Kantronics KAM, a PK232 or any packet TNC. It can replace the filtering in most units with one that is optimized for any baud rate or shift. For example, when 45 baud RTTY is used, the filters can adjust to 170 Hz shift. When 300 baud HF packet is selected, you can load in a new filter with optimum performance. The DSP can improve the otherwise sluggish filtering in the KAM or take care of the distortion problem in the PK 232.

If you are trying to copy an AMTOR station on the ham bands and a CW station is close in frequency, you can add a notch filter to the DSP and knock out the interference.

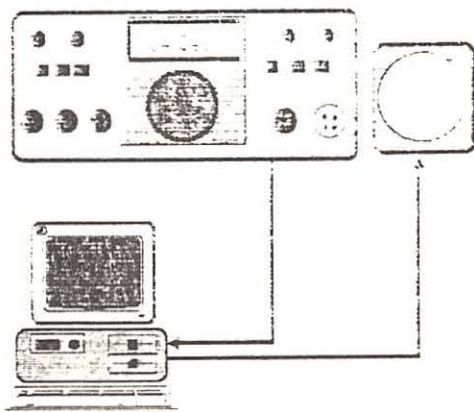
It's all possible because the DSP is software driven; if the programs are

available, you can do it.

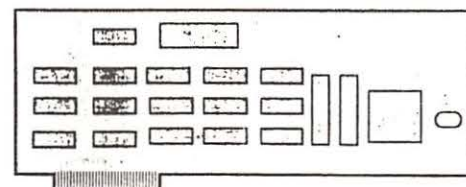
I can just imagine what it will be like a few years from now. A DSP users group will exchange public domain DSP software. When a new digital mode pops up on the SW bands, a DSP guru will develop the software and share it with you or me. We won't have to buy a new TV or radio modem to keep up with the latest technology.

The best thing about the DSP board is that it's a separate processor from the PC. I can jump out of the DSP setup software and run packet on the same computer. I can even run a word processor and write this column while the DSP acts like a filter. The DSP also has an audio output for connecting a speaker/amplifier. I can load in a filter program that will knock out a heterodyne interference while copying a SW broadcast. The DSP can also display a panoramic view of the audio spectrum by showing the amplitude and frequency on the PC's monitor.

Like I said last year, "The '90s are here and you will be seeing new technologies that will make the RTTY hobby more exciting than ever." *MT* will keep you posted with further DSP developments. NNNNN



With this setup you can use the DSP as an audio filter or a radio modem.



The DSP is a PC compatible and plugs into the 10" expansion slot.

Across the Bands

We have the usual nice variety of loggings from "Outer Limits" readers. It is appropriate we start out with one from Stan Mayo in Maine. Stan caught KUSA at 1558 on 25840 in USB. KUSA was giving out the address and phone number of the Iraqi embassy for any listeners who wanted to register complaints.

The station's full ID is KUSA Dairy Land or KUSA Wisconsin. Alternate frequencies are 6210 and 7415. Does anybody have an address?

Last summer the "Outer Limits" column was the first to announce that a five kilowatt mediumwave pirate was on the way. Well, it showed up, and John Demmitt found it on 1620 at 0307. The station was WJDI with a nice variety of music, comedy ads, and commentary. John reports the address given was Box 3821, Kingston, NY 12401.

WJDI invited other stations to use 1620, and John reports that at 0511 Radio Wolf International did just that. The brief transmission included greetings to WJDI.

David Sutton of Illinois sent along his first contribution to an MT column. It was a log of Hope Radio International on 7413 at 0304. David still loves the old tube communications receivers and does his monitoring on a Hammarlund HQ-180.

Way out west in California Skip Harwood came across Radio Anarchy at 0210 on 7417. Skip has heard from the station, and the

operator says he is rebuilding his transmitter. He plans to try 9990 in the future.

Another Californian, Bill Wolverton, reports a most unusual card from a busted west coast pirate. Zodiac Radio used its former QSL cards to send Christmas greetings -- better late than never -- to its listeners.

Speaking of cards, we thought the one received here from Radio Animal of WKND and Radio Wolf International was too good not to share (below). Radio Animal also sent us a log of Hope Radio on 7413 with a program about UFOs.

Minnesota's Alan Masyga got an unusual log on 7412.5 at 0058 when he came across CKLW. This station apparently has a nice blend of its own material plus old Motown songs once played by the licensed CKLW in Windsor, Ontario.

What is a month without some Pat Murphy logs? From his Virginia monitoring post, Pat, as usual, had all kinds of success. KNBS made an appearance on 3474 at 0200 with, among other things, an editorial on the annexation of Canada. Well, maybe Radio Beaver or CFBN will counter with an editorial on the annexation of the USA.

Action Radio made it to Pat's location on 7415 at 2250 with heavy metal music. Pat also had the WJDI broadcast on 1620 as well as Radio USA on 7413 at 1928. Radio USA had the pirate news program by Radio Animal,

which is aired on several stations.

Yes, yours truly does manage to hear a couple occasionally. WORK showed up for the very first time here on 7415 kHz at 2339 UTC. This station claims to represent the working man. Some very strong reception of Hope Radio International was encountered on 15050 in a 2100 UTC broadcast. One of the unusual things about this transmission was that it was on a week day.

This and That:

To Radio America: I will be happy to answer your question if you will send me an address.

DSI is a maildrop which says it represents a number of shortwave stations plus several on mediumwave and FM. Some radio beacons also use its service. A list of stations and frequencies is available for \$1. Those wanting a copy or more information about the drop can write DSI, P.O. Box 892, Northboro, MA 01532-0892.

Clandestine expert George Zellner writes in ACE that Colombian Radio Patria Libre appears to have been shut down by the Colombian army. Patria Libre could often be heard in the vicinity of 6300 around 0100. Meanwhile the black clandestine, which Zellner may have been the first to hear, is still going strong. It puts in a nice signal in Central Florida. Del Pueblo Responde (The People Respond) was apparently intended as a jammer for Patria Libre, but now itself is sometimes jammed by a Latin American music station.

Most likely the black is the product of the Colombian government. It tends to jump frequency every few minutes, and once I heard it land right on top of the music jammer it was trying to evade. Even if you don't normally chase after clandestines, you might find this one fascinating to monitor.

We have been expecting more Kurdish clandestine activity as a result of the conflict over Kuwait. The Kurds are a stateless people found in Turkey, Iran and especially Iraq. For years they have struggled without success for a state of their own. The Kurdish revolt in Iraq was put down ruthlessly by Saddam Hussein, who resorted to chemical warfare (gas) in order to do so. It seems logical, however, that certain governments might want to give the Kurds a little "encouragement" at this time.

Terry Krueger reports a rather significant jammer on the variable frequency of 4005 around 0414. Most likely this is intended to block "Voice of the People of Kurdistan"



TO DR. JOHN...

FROM
RADIO ANIMAL
BARK FOR FREE RADIO

STRETCH

your \$\$\$
with a
3 year
subscription!

SCORPIO

ID(Sta): Radio Moscow Location: Leningrad / USSR
Date: 10-23-90 Begin Prg: 01:30:17 End Prg: Freq: 7.305.00
Mode: AM Signal: Agg/Svc: Broadcast QSL: S
Remarks: Contemporary Russian Music and News
Data: 230: 07/28/83 / 01:00 > 02:15 / 7.305.00 AM / Signal (59+30) #230
[Radio] [x->] [CLS] Manual Mode [CLD] [S/F] [Qu/Ex]
LogScan Log of John Doe

Terminal Unit Display Window

Terminal Unit Command Window

1 ID(Sta) 2 Locatn 3 Signal 4 Agency 5 Remark 6 TimeOn 7 TimeOff 8 Clear 9 Log 10 Optns

Integrated Multi-Function Communications Software for IBM PCs

Simultaneous

■ Radio Control / Scanning

■ Log Database Management

■ TU Digital Control/Disp

> LogScan, AutoLog and AutoTU functions > Interfaces with All Mode Terminal Units
> Mouse/Function Key control of Kenwood & Icom Rcvrs & RS232 Digital Terminal Units
> Search Log by any field including Remarks > Scan Receiver based on Log Search criteria
> Copy RTTY & other DIGITAL signals > AutoTU sets TU mode as needed during scan
> LogScan has real time UTC and FRQ. limit options > AutoLog builds database from "hits"
> Run other programs (or DOS) from within Scorpio > Includes HF database & Manual

MasterCard

\$89.95 (+ \$5.00 S&H)

Visa

ashtron

PO Box 830 - Dandridge, TN 37725 - (615-397-0742)
CompuServe # 72557, 3560

PIRATE RADIO ON VIDEO

INSIDE PIRATE RADIO is a first hand look into the underground world of the growing free radio movement.

In this video, you'll talk to author and Piate Radio monitoring expert, Andrew Yoder, about when and where to listen, logging, QSL's, drop boxes and more.

Also, sit in the studio and talk with experienced Pirates about why they do it, programming, equipment and more. Then go into the field with them to broadcast!

Plus, a special bonus section: **How To Avoid the FCC if You Broadcast!**



INSIDE PIRATE RADIO
retails for \$19.95 (VHS)
including S/H. We offer
a money back guarantee
and accept
Visa, MC,
checks and
UPS C.O.D.

\$19.95

THE FRANKLIN VIDEO GROUP

875 NORTH YOUNG STREET
FRANKLIN, INDIANA 46131

1-800-255-5659



Running Time:
Approx. 60 min.



supposedly on that frequency between 0300 and 0430. Krueger notes the jammer engages in rapid hops between 4000 and 4014 kHz.

More International News:

The Far Eastern Economic Review reports that a Burmese clandestine in the Wa Hills near the border with China is again active. The station at one time was operated by the Communist Party of Burma, but an April 1989 mutiny sent most of the rank and file over to the government side and brought about an end to broadcasting. Whether the current broadcasts have the approval of the government or represent a change of heart on the part of some of the mutineers is not known.

Unfortunately, we have no present time or frequency information for this station. In the past, 5109 was one of the frequencies it employed, and reception around 1230 UTC was by no means rare even on the east coast of North America.

The new Italian radio law which goes into effect on January 1, 1993, will apparently allow for a few private shortwave stations while ending all unlicensed but currently legal radio activity in that country. The law puts strict limits on the amount of advertising that can be broadcast and requires all national networks to carry news programs. There are limitations on station ownership by newspapers and restrictions on advertising

agencies as well.

We don't know if Voice of Europe will be one of the fortunate few stations to receive a license or not, but in the meantime you have a good chance to hear it. Supposedly it is going to go to 24 hours a day on 13710 with increased power.

Albania is the most recent and last of the

Eastern European countries to experience dramatic political, economic and social change. Bob Thomas says you can catch the news in English at 0230 and 0330 on 9760 and 11825.

CfBN fly by night canada's radio



QSL No. 084
to John Santusovsso
Date Nov 01/90
Time 0210-0230 UTC
Frequency 7415
Signature HOUSE
BLACK

CfBN is one of Canada's most widely heard pirates.

notes from the frequency manager . . .**Greg Jordan***P.O. Box 98
Brasstown, NC 28902***Larry Miller***Pennsylvania*

We've been working very hard on the frequency section. Several of us compared the effort to the current restoration of Michaelangelo's frescos at the Vatican. Here we have a frequency section that has been widely acclaimed as the most accurate in the world. Dare we touch it?

The answer is yes. Over time, our work, like Michaelangelo's, gathers the tarnish of age. Because it happens so slowly and over such a long period of time, though, the deterioration is not noticeable.

We unveil for you now a frequency section in the final stages of restoration. Yes, you'll find a scaffold or two still in place. But overall, we feel that we have brought you a far more detailed, more comprehensive listing.

Every listing here is for an English language broadcast. Sometimes, however, when you try one of these frequencies, you will hear something other than English. This is because different stations often use the same frequency at the same time. So that's why, when listening for the East Bangli regional station making its once-a-week transmission in English, you hear instead Deutsche Welle in Spanish.

It doesn't mean that East Bangli is no longer on the air or that there is a mistake in the listing (although those do exist in so large an undertaking). It just means that the gods of propagation aren't smiling on you just now.

You might find it helpful to check the target code after each frequency (The legend is found on the opposite page) in order to determine exactly where the broadcaster intends the broadcast to go. Of course we all know that intention is no guarantee and that's why sometimes, just sometimes, we can hear East Bangli with their once-a-week broadcast in English.

Next month, we put the frequency section in the blender again as everyone begins to change frequencies for the spring season at the end of this month.

We welcome your comments, corrections and other information. Both individual monitoring reports and advance schedules from stations are welcome. For speediest delivery, send them via fax at 1-704-837-2216. It's on 24 hours a day. Or you can write to me, frequency manager, P.O. Box 98, Brasstown, NC 28902.

notes from the program manager . . .**Kannon Shanmugam***4412 Tumbery Circle
Lawrence, Kansas 66047***John Carson***Oklahoma***Jim Frimmel***Texas*

WAR UPDATE: The Gulf War has obviously led to many changes in stations' programming. It's impossible to forecast at press time exactly what changes will still be in effect when this issue reaches your hands in a few days, due to the fast-changing situation. Nevertheless, the BBC has regularly been preempting programming at 2200-0030 UTC and 0500-0730 UTC for Gulf coverage. Also be prepared for preemptions on Kol Israel (in this month's listings) and the Voice of America.

Radio Baghdad has to my knowledge never issued a program schedule, but tune in for news at the start of programming, at 0230 UTC, 1100 UTC, 1700 UTC, and 2100 UTC.

BEEB REPORT: BBC highlights for March follow. First, catch "The Reith Lectures" -- a series of lectures delivered yearly and named after the Beeb's first director-general, Lord Reith. This year's presenter is Jonathan Sacks, head of the Jewish religion in the UK. His lectures can be heard on Fridays (except on the 29th) at 1215 UTC.

A series of rock music performance staged for radio airs "On Stage," Tuesdays at 0630 UTC (Monday nights for West Coast listeners) with a repeat on Wednesdays at 1615 UTC. Finally, hear a rerun of the series "Stone's America," with vignettes on various subjects about America. The airtime is Tuesday nights in

North America (Wednesdays UTC) at 0230 UTC.

LOVE ON SHORTWAVE? We've heard a lot of strange reports about things which stations require in order for a listener to receive a QSL, but this one takes the cake. It comes from Kevin Gooch in Kirksville, Mo. Kevin reports that Radio Kiev is sending free gifts to anyone who heard their program "Music from Ukraine" on New Year's Eve last year and who sent a reception report with the words, "Radio Kiev, I love you"! The things listeners will do...

SUGGESTIONS WELCOME: As always, we'd love to hear from you at the address above as to how we can improve the section. Rest assured that we never stop trying to bring you the most up-to-date information on what's on the airwaves. The program listings are transmitted via modem just before press time from the program section offices in Lawrence, Kansas, to the MT home office in Brasstown, North Carolina, thus ensuring that the information that you have in front of you is the most current in the industry.

It's a record which we're very proud of. And we hope it provides you with the information you need. If not, please let us know. Thanks.

how to use the shortwave guide

The all-new, totally revamped frequency section of *Monitoring Times* is a professional-level tool designed to help you hear more stations. You'll find three main elements: frequencies, propagation charts, and programming. The frequencies will tell you where to tune; the propagation charts will help you to use your listening time more effectively by predicting the likelihood of hearing a station or stations from a particular part of the world; then the programming section will give you some idea of what to expect when you tune the station in.

The frequency section now includes virtually every English language transmission in the world including those directed to other parts of the world as well as North America. Do not be disappointed if you do not hear some of these on your first time out. Their level of difficulty ranges from "muddling" to, literally, "once-in-a-lifetime." If such challenges frustrate you, stick to the frequencies directed solely to your target area.

The first four digits of a listing are the start time in UTC or "Universal Time Coordinated." Because this so-called "world time" can be confusing, we have provided corresponding local time for the Eastern ("EST") and Pacific ("PST") time zones.

The second four digits of the listing represent the closing time of the transmission. All stations are listed in order of their start time, end time and alphabetical standing.

The space between the transmission end and the name of the station is the broadcast schedule. If there is no entry here (as is most often the case), the transmission is made every day. In other cases, the letters **S** (Sunday), **M** (Monday), **T** (Tuesday), **W** (Wednesday), **Th** (Thursday), **F** (Friday) and **A** (Saturday) represent the days of the week that the transmission can be heard. Other schedule codes are "**ten**" which means that the schedule is tentative, "**tes**" which means that it is a test transmission and "**war**" which means that the station's schedule has been disrupted by armed conflict.

The next listing is the station's name and location. Occasionally, you will find one of the following codes after the station name: ¹the transmission is multilingual, containing both English and another language(s), ²the broadcast contains nothing but music, ³the English broadcast is transmitted irregularly and ⁴the transmission is an English language lesson.

Frequencies are listed in ascending order, from lowest to highest. We suggest that you begin with the lowest frequency and work your way up to the highest frequency. Of course, keep in mind that the lower frequencies generally work better at night; the higher ones during the day. Not all frequencies will be audible at any given time.

Shortwave, or "world band" transmissions are often targeted to specific areas of the world. Following each frequency is a code indicating the area of the globe

to which the frequency is "officially" directed. While such a scheme often gives listeners a fair idea of the likelihood of receiving a particular broadcast, remember that in shortwave, there are no hard and fast rules. Voice of America shows sent to Africa in our late evening, for example, are easily heard in North America. Do not hesitate to try and hear any transmission listed in this section.

For easy-going, look for frequencies directed to **na** (North America), **ca** (Central America or Caribbean), and **am** (Americas). Other codes include **af** (Africa), **as** (Asia), **au** (Australia), **eu** (Europe), **me** (Middle East), **pa** (Pacific), and **sa** (South America). If a transmission is directed to North America and some other area, we list it as North America-bound. If it is directed to a number of different (non-American) targets, we list it as "**va**" (various). Transmissions marked "**do**" are for domestic or local consumption. Again, it is possible that you can hear these. Finally, you will occasionally see a transmission listed as "**om**" (omnidirectional -- sent out in all directions simultaneously), or "**??**" (we don't know where it is supposed to be going).

Remember, this is a list of all English language transmissions to the world. It includes not only the powerhouse, easy-to-hear stations from the United States, Canada, Germany and the Soviet Union, but tiny local broadcasters like the 40 watt Tristan Radio, located on a tiny island located in the middle of the South Atlantic. Your chances of hearing such a station are, quite frankly, near nil.

Desiring, however, to provide you with every possible tool so that you can effectively search out such rare fare, we also include propagation charts with this section. These are found at the conclusion of the frequency/program list and are designed to give you an idea of the best time to try for a particular station or region. Instructions for using the propagation charts are found at the beginning of that section.

A list of suggested programs can be found under the frequencies for that hour. They are listed in order of their start time in UTC. This list of programs changes every month in order to give you a wide familiarity with what shortwave's over 1,100 frequencies can bring you.

Please note that some program listings may be followed by "See X 0000." The letter stands for a day of the week (see day code legend for the frequency section). The four digits stand for a time in UTC. Listeners should check back to that date and time to find out more about that particular program.

Remember that, unlike many other publications, *Monitoring Times* makes changes to this list up to two weeks before press time and is thus able to keep this list among the most accurate in the world. Errors will naturally occur and we ask your assistance in correcting them.

You may address your corrections, additions and suggestions to Frequency Manager, P.O. Box 98, Brasstown, NC 28902. You may also fax changes to us at 1-704-837-2216 24 hours a day.

newsline

"Newsline" is your guide to news broadcasts on the air. ■ All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. ■ All broadcasts are daily unless otherwise noted by brackets enclosing the day codes.

0000 UTC	Radio Beijing*	0100 UTC	Radio Havana Cuba [T-S]	Radio Havana Cuba [T-S]
BBC	0030	All India Radio	Radio Havana Cuba* [T-S]	Radio Luxembourg
Christian Science Monitor	BRT, Brussels [T-A]	BBC	0125	Radio Moscow
Kol Israel	Christian Science Monitor	HCJB	HCJB	Radio New Zealand Int'l [M-F]
Radio Australia	(Asia) [M]	0130	Christian Science Monitor	Radio Romania Int'l
Radio Beijing	Christian Science Monitor [T-F]	(Asia) [M]	(Asia) [M]	Radio Thailand
Radio Canada Int'l	HCJB*	Christian Science Monitor [T-F]	Christian Science Monitor [T-F]	Swiss Radio Int'l
Radio Finland [T-A]	Radio Budapest [T-S]	Radio Austria Int'l	Radio Austria Int'l	Voice of America
Radio Havana Cuba [T-S]	Radio Canada Int'l [S-M]	Radio Budapest	Radio Budapest	Voice of Free China
Radio Kiev	Radio Havana Cuba [T-S]	Radio Havana Cuba [T-S]	Radio Havana Cuba [T-S]	WWCR (USA Radio News) [T-A]
Radio Korea	Radio Jamahiriya, Libya	Radio Japan	Radio Moscow (World Service)	0215
Radio Luxembourg	Radio Netherlands [T-S]	Radio Luxembourg	Voice of Greece [M-A]	BBC (Asia)
Radio Moscow	Voice of America (Americas, East Asia) (Special English) [T-S]	Radio Moscow	0155	Radio Cairo
Radio New Zealand Int'l [M-A]	0045	Radio New Zealand Int'l [M-F]	Voice of Indonesia	0230
Radio Prague Int'l	Radio Korea (News Service)	Radio Prague Int'l	WRNO (ABC News) [W, A]	Christian Science Monitor
Radio Sofia	0055	Radio Thailand	0200 UTC	(Africa, Europe) [M]
Radio Thailand	WRNO (ABC News) [H, A]	Radio Yugoslavia	BBC	Christian Science Monitor [T-F]
Spanish Foreign Radio		Radiotelevisione Italiana	Christian Science Monitor	HCJB*
Voice of America		RAE, Buenos Aires [T-A]	Deutsche Welle	Radio Havana Cuba [T-S]
WWCR (USA Radio News) [T-A]		Spanish Foreign Radio	Kol Israel	Radio Moscow (World Service)
0005		Voice of America	Radio Australia	Radio Pakistan (Special English)
Radio Pyongyang		Voice of Indonesia	Radio Canada Int'l [T-A]	Radio Portugal [T-A]
0010		WWCR (USA Radio News) [T-S]		Radio Tirana, Albania

newslines

0245

Radio for Peace Int'l (UN
Radio) [T-A]
Radio Korea (News Service)

0300 UTC

BBC
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Beijing
Radio Belize
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Prague Int'l
Radio Thailand
Voice of America
Voice of Free China
WWCR (USA Radio News) [T-S]

0309

BBC*

0310

Radio Beijing*

0315

Radio Cairo
Radio Havana Cuba* [T-S]

0325

HCJB

0330

BBC (Africa)*
Christian Science Monitor
(Africa, Europe) [M]
Christian Science Monitor [T-F]
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Netherlands [T-S]
Radio Tirana, Albania
UAE Radio, Dubai

0340

Voice of Greece [M-A]

0350

Radio Yerevan
Radiotelevisione Italiana

0355

Radio Japan [M-F]

0400 UTC

BBC
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Beijing
Radio Canada Int'l
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Prague Int'l
Radio Romania Int'l
Radio RSA
Radio Sofia
Radio Tanzania
Radio Thailand
Swiss Radio Int'l
Voice of America
Voice of Turkey
WRNO (ABC News) [F]
WWCR (USA Radio News) [M-A]

0405

Radio New Zealand Int'l* [M-F]
Radio Pyongyang

0410

Radio Beijing*

0425

Radiotelevisione Italiana

0430

BBC (Africa)*

Christian Science Monitor
(Africa, Europe, NE Asia) [M]
Christian Science Monitor [T-F]
Radio Botswana
Radio Canada Int'l [T-A]
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Tirana, Albania

0450

Radio RSA

0455

WYFR (Network) [T-A]

0500 UTC

BBC
Christian Science Monitor
Deutsche Welle
HCJB*
Kol Israel
Radio Australia
Radio Beijing
Radio Havana Cuba [T-S]
Radio Japan
Radio Lesotho
Radio Moscow
Radio New Zealand Int'l [M-A]
Radio Thailand
Spanish Foreign Radio
Voice of America
WWCR (USA Radio News) [T-A]

0510

Radio Beijing*

Radio Botswana

0515

Radio Havana Cuba* [T-S]

0530

Christian Science Monitor
(Africa, Europe, NE Asia) [M]
Christian Science Monitor [T-F]
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Jordan
Radio Moscow (World Service)
Radio Romania Int'l
Radio Thailand
UAE Radio, Dubai
Voice of Nigeria

0545

Voice of Nigeria*

0555

HCJB

0600 UTC

BBC
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l [M-F]
Voice of America

0605

Radio New Zealand Int'l* [M-F]

Radio Pyongyang

0610

Voice of Malaysia

0618

Radio Canada Int'l [M-F]

0630

BBC (Africa)*

Christian Science Monitor [M-F]

Radio Havana Cuba [T-S]

Radio Moscow (World Service)

Radio Polonia

Radio Tirana, Albania

Swiss Radio Int'l

0640

Radio Prague Int'l

0645

Radio Romania Int'l

0700 UTC

BBC
Christian Science Monitor
Radio Australia
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Tirana, Albania
Voice of Free China

0715

Radio Havana Cuba* [T-S]

0730

BBC (Africa)*
BRT, Brussels [M-F]
Christian Science Monitor [M-F]
HCJB*

Radio Austria Int'l

Radio Finland [T-A]

Radio Havana Cuba [T-S]

Radio Moscow (World Service)

Radio Netherlands [M-A]

Radio Prague Int'l

Radio Sofia

Swiss Radio Int'l

0755

Radio Japan [M-F]

0800 UTC

BBC
Christian Science Monitor
Radio Australia
Radio Jordan
Radio Korea
Radio Moscow (World Service)
Voice of Indonesia

0805

Radio Pyongyang

0810

Voice of Malaysia

0825

HCJB

0830

Christian Science Monitor [M-F]

Radio Beijing

Radio Moscow (World Service)

Radio Netherlands [M-A]

Swiss Radio Int'l

0840

Radio Beijing*

Voice of Greece [M-A]

0855

Voice of Indonesia

0900 UTC

BBC
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Finland [T-A]
Radio Japan
Radio Moscow (World Service)
0915
Radio Korea (News Service)
0930
Christian Science Monitor [M-F]
Deutsche Welle (Africa)* [M-F]
Radio Beijing
Radio Finland [T-A]
Radio Moscow (World Service)
0940

Radio Beijing*

0955

Radio Japan [M-F]

1000 UTC

All India Radio
BBC
BRT, Brussels [M-F]
Christian Science Monitor
HCJB*
Radio Australia
Radio Jordan
Radio Moscow (World Service)
Radio Tanzania
Swiss Radio Int'l
Voice of America

1030

Christian Science Monitor [M-F]

Radio Austria Int'l [M-F]

Radio Moscow (World Service)

Radio Netherlands [M-A]

UAE Radio, Dubai

1040

Voice of Greece [M-A]

1055

All India Radio

HCJB

1100 UTC

BBC
Christian Science Monitor
Deutsche Welle
Kol Israel
Radio Australia
Radio Beijing
Radio Japan
Radio Jordan
Radio Korea
Radio Moscow (World Service)
Radio RSA
Swiss Radio Int'l
Trans World Radio, Bonaire
[M-F]
Voice of America

1105

Radio Pakistan (Special English)

Radio Pyongyang

1109

BBC*

1110

Radio Beijing*

Radio Belize [T-A]

Radio Botswana [M-F]

1115

Radio Korea (News Service)

1125

Radio Belize [M]

Radio Botswana [A-S]

1130

Christian Science Monitor [M-F]

Deutsche Welle* [M-F]

Radio Austria Int'l [M-F]

Radio Korea [M-S]

Radio Lesotho

Radio Moscow (World Service)

Radio Netherlands [M-A]

1135

Radio Thailand

1150

Radio Finland [T-F]

Radio RSA

1155

Radio Japan [M-F]

1200 UTC

BBC

Christian Science Monitor

Radio Australia
Radio Beijing
Radio Bras, Brasilia [M-A]
Radio Jordan
Radio Moscow (World Service)
Radio Polonia
Radio Romania Int'l
Radio Tashkent
Radio Thailand
Voice of America
1210
Radio Beijing*
1215
Radio Korea
1230
Christian Science Monitor [M-F]
Radio Cairo
Radio France Int'l
Radio Moscow (World Service)
Trans World Radio, Bonaire
[M-A]
1235
Voice of Greece

1300 UTC

BBC
Christian Science Monitor
Radio Australia
Radio Beijing
Radio Belize
Radio Canada Int'l (Asia)
Radio Canada Int'l (North America) [M-F]
Radio Finland [T-F]
Radio Moscow (World Service)
Radio Romania Int'l
Radio Tanzania [A-S]
Radio Tirana, Albania
Radio Yugoslavia
Swiss Radio Int'l
Trans World Radio, Bonaire
[S]
Voice of America
WWCR (USA Radio News) [S-F]

1305

Radio Pyongyang

1310

Radio Beijing*

1325

HCJB [M-F]

1328

Radio Cairo

1330

All India Radio
Christian Science Monitor [M-F]

Radio Austria Int'l

Radio Korea (News Service)

Radio Moscow (World Service)

Radio Tashkent

Swiss Radio Int'l

UAE Radio, Dubai

Voice of America (Special English)

Voice of Turkey

1346

All India Radio (UN News) [A]

1355

WYFR (Network) [M-F]

1400 UTC

BBC
BRT, Brussels [M-F]
Christian Science Monitor
Radio Australia
Radio Beijing

newslines

Radio Belize [M-F]
 Radio Canada Int'l [S]
 Radio Finland [T-A]
 Radio France Int'l
 Radio Japan
 Radio Jordan
 Radio Korea
 Radio Moscow (World Service)
 Radio Peace and Progress
 Voice of America
 WWCR (USA Radio News) [M-F]
1405
 Radio Pyongyang
1410
 Radio Beijing*
1425
 HCJB [M-F]
1430
 Christian Science Monitor [M-F]
 Radio Austria Int'l [M-F]
 Radio Moscow (World Service)
 Radio Netherlands [M-A]
 Radio Polonia
1455
 All India Radio

1500 UTC

BBC
 Christian Science Monitor
 Deutsche Welle
 Radio Australia
 Radio Beijing
 Radio Belize [M-A]
 Radio Finland [T-A]
 Radio Japan
 Radio Moscow (World Service)
 Radio Romania Int'l
 Radio RSA
 Voice of America
 WWCR (USA Radio News)
1505
 Radio Pyongyang
1510
 Radio Beijing*
1515
 Radio Canada Int'l (Europe)
1525
 Radio Finland
1530
 Christian Science Monitor [M-F]
 Deutsche Welle* [M-F]
 FEBA, Seychelles
 Radio Moscow (World Service)
 Radio Tirana, Albania
 Swiss Radio Int'l
 Voice of Greece [M-A]
1545
 Radio Korea (News Service)

1600 UTC

BBC
 Christian Science Monitor
 Deutsche Welle
 Radio Australia
 Radio Beijing
 Radio France Int'l
 Radio Jordan
 Radio Korea
 Radio Lesotho
 Radio Moscow (World Service)
 Radio Polonia
 Radio Portugal [M-F]
 Radio RSA
 Radio Tanzania
 Voice of America
 WWCR (USA Radio News) [M-

F]
1609
 BBC*
1610
 Radio Beijing*
 Radio Botswana [M-F]
1630
 Christian Science Monitor [M-F]
 Radio Austria Int'l
 Radio Moscow (World Service)
 Radio Netherlands [M-A]
 Radio Polonia
 UAE Radio, Dubai
 Voice of America (except Africa) (Special English)
1655
 WYFR (Network) [A]

1700 UTC

BBC
 Christian Science Monitor
 Radio Australia
 Radio Beijing
 Radio Belize [M-F]
 Radio Japan
 Radio Jordan [S-H]
 Radio Moscow (World Service)
 Radio New Zealand Int'l [M-F]
 Radio RSA
 Voice of America
1705
 Radio New Zealand Int'l* [M-F]
 Radio Pyongyang
1709
 BBC (Africa)* [A-S]
1710
 Radio Beijing*
1715
 Radio Canada Int'l
 Radio Korea (News Service)
1730
 Christian Science Monitor [M-F]
 Radio Moscow (World Service)
 Radio Peace and Progress
 Radio Romania Int'l
1735
 WYFR (Network) [M-F]
1740
 BBC (Africa)*
1750
 Radio RSA

1800 UTC

All India Radio
 BBC
 Christian Science Monitor
 Kol Israel
 KVOH (UPI News)
 Radio Australia
 Radio Belize [M-F]
 Radio Bras, Brasilia [M-A]
 Radio Canada Int'l
 Radio Korea
 Radio Moscow (World Service)
 Radio New Zealand Int'l [S-F]
 Radio Prague Int'l
 Radio Tanzania
 RAE, Buenos Aires [M-F]
 Voice of America
 WWCR (USA Radio News) [A]
1825
 WYFR (Network) [A]
1830
 BRT, Brussels [M-F]
 Christian Science Monitor [M-F]
 Radio Belize

Radio Moscow (World Service)
 Radio Netherlands [M-A]
 Radio Polonia
 Radio Tirana, Albania
 Swiss Radio Int'l
 Voice of America (Special English)
1840
 SLBC, Sri Lanka
 Voice of Greece
1855
 BBC (Africa)* [M-F]

1900 UTC

All India Radio
 BBC
 Christian Science Monitor [M-A]
 Deutsche Welle
 HCJB*



Mohamed Ghuneim of the Voice of America's Amman Bureau.

KVOH (UPI News)
 Radio Australia
 Radio Beijing
 Radio Canada Int'l [M-F]
 Radio Havana Cuba [M-A]
 Radio Japan
 Radio Jordan [S-H]
 Radio Moscow (World Service)
 Radio New Zealand Int'l [S-F]
 Radio Tanzania
 Spanish Foreign Radio
 Voice of America
 WWCR (USA Radio News) [M-F]
1903
 Radio Jamahiriya, Libya
1910
 Radio Beijing*
 Radio Botswana
1920
 Voice of Greece
1930
 Christian Science Monitor [M-F]
 Deutsche Welle* [M-F]
 Radio Austria Int'l
 Radio Budapest
 Radio Canada Int'l [M-F]
 Radio Finland [M-F]
 Radio Havana Cuba [M-A]
 Radio Moscow (World Service)
 Radio Prague Int'l
 Radio Romania Int'l
 Radio Sofia
 Radio Yugoslavia
1935
 Radiotelevisione Italiana
1945
 Radio Korea (News Service)

1947
 Radio Jamahiriya, Libya
1955
 HCJB
 Radio Finland
 WYFR (Network) [M-A]

2000 UTC

BBC
 Christian Science Monitor
 Kol Israel
 KVOH (UPI News)
 Radio Australia
 Radio Beijing
 Radio Belize [M-F]
 Radio Havana Cuba [M-A]
 Radio Jordan [S-H]
 Radio Moscow (World Service)
 Radio New Zealand Int'l [S-F]
 Radio Polonia
 Radio Portugal [M-F]
 Swiss Radio Int'l
 Voice of America
 Voice of Indonesia
2005
 Radio New Zealand Int'l* [S-H]
 Radio Pyongyang
2010
 Radio Beijing*
2025
 Radio Havana Cuba* [M-A]
 Radiotelevisione Italiana
2030
 Christian Science Monitor [M-F]
 Radio Havana Cuba [M-A]
 Radio Korea
 Radio Moscow (World Service)
 Radio Netherlands [M-A]
2045
 Radio Korea (News Service)
2055
 Voice of Indonesia

2100 UTC

All India Radio
 BBC
 Christian Science Monitor [M-A]
 Deutsche Welle
 KVOH (UPI News)
 Radio Australia
 Radio Beijing
 Radio Belize [M-F]
 Radio Japan
 Radio Jordan [S-H]
 Radio Kiev
 Radio Moscow (World Service)
 Radio New Zealand Int'l [S-F]
 Radio Portugal [M-F]
 Radio Prague Int'l
 Radio Romania Int'l
 Spanish Foreign Radio
 Swiss Radio Int'l
 Voice of America
 Voice of Turkey
2110
 Radio Beijing*
2125
 WYFR (Network) [M-F]
2130
 Christian Science Monitor [M-F]
 Radio Budapest
 Radio Cairo
 Radio Canada Int'l
 Radio Moscow (World Service)
 Radio Sofia

2200 UTC

All India Radio
 BBC
 BRT, Brussels [M-F]
 Christian Science Monitor
 Radio Australia
 Radio Beijing
 Radio Canada Int'l (Asia)
 Radio Canada Int'l (Europe)
 Radio Finland [M-F]
 Radio Havana Cuba [M-A]
 Radio Moscow (World Service)
 Radio New Zealand Int'l [S-F]
 Radio Peace and Progress
 Radio Prague Int'l
 Radio Yugoslavia
 Radiotelevisione Italiana
 Voice of America
 Voice of Free China
2208
 Voice of America (Caribbean)* [M-F]
2210
 Radio Beijing*
2225
 Radio Havana Cuba* [M-A]
2230
 Christian Science Monitor [M-F]
 Kol Israel
 Radio Havana Cuba [M-A]
 Radio Moscow (World Service)
 Radio Polonia
 Radio Sofia
 Radio Tirana, Albania
 Radio Vilnius
 Swiss Radio Int'l
 Voice of America (Special English)
 WYFR (Network) [M-F]
2245
 Voice of Greece
2255
 WYFR (Network) [M-A]

2300 UTC

BBC
 Christian Science Monitor [M-A]
 Radio Australia
 Radio Belize [M-F]
 Radio Canada Int'l
 Radio Japan
 Radio Moscow
 Radio New Zealand Int'l [S-F]
 Radio Vilnius
 Voice of America
 Voice of Turkey
2305
 Radio Polonia
 Radio Pyongyang
2315
 All India Radio
 Radio for Peace Int'l (UN Radio) [M-F]
2320
 Radio Thailand
 Christian Science Monitor [M-F]
 Radio Moscow (World Service)
 Radio New Zealand Int'l [S-H]
 Radio Tirana, Albania
2333
 Radio Jamahiriya, Libya
2355
 Radio Japan [M-F]

0000 UTC**[7:00 PM EST/4:00 PM PST]****FREQUENCIES**

0000-0015	Voice of the People of Cambodia, Phnom-Penh	9695 _{as}	11938 _{as}	0000-0100	SBC Radio 1, Singapore	5010 _{do}	5052 _{do}	11940 _{do}
0000-0030	Radio Australia, Melbourne	11880 _{va}	13605 _{va}	15240 _{va}	0000-0100	SLBS, Freetown, Sierra Leone	3316 _{do}	
		15465 _{va}	17630 _{va}	17750 _{va}	0000-0100	Radio Thailand, Bangkok	4830 _{as}	9655 _{as} 11905 _{as}
		17795 _{va}	17855 _{va}		0000-0100	Spanish Foreign Radio, Madrid	9630 _{na}	11880 _{na}
0000-0030 stwhfa	R. Prague, Czechoslovakia	7345 _{na}	9540 _{na}	11990 _{na}	0000-0100	Voice of America, Washington	6125 _{as}	7120 _{as} 9770 _{as}
0000-0030	BBC London, England	5965 _{va}	5975 _{va}	6005 _{va}			11760 _{as}	11805 _{as} 15185 _{as}
		6175 _{va}	6195 _{va}	7145 _{va}			15225 _{as}	15290 _{as} 15405 _{as}
		7325 _{va}	9580 _{va}	9590 _{va}			17735 _{as}	17820 _{as}
		9670 _{va}	9915 _{va}	11750 _{va}	0000-0100	KTBN Salt Lake City, Utah	15590 _{am}	
		11945 _{va}	11955 _{va}	12095 _{va}	0000-0100	WRNO New Orleans, Louisiana	7355 _{am}	
		15070 _{va}	15260 _{va}	15360 _{va}	0000-0100	WHRI Noblesville, Indiana	7315 _{am}	9495 _{am}
		17830 _{va}			0000-0100	WINB Red Lion, Pennsylvania	15145 _{eu}	
0000-0030	Kol Israel, Jerusalem	7495 _{na}	9435 _{na}	11605 _{na}	0000-0100	WYFR, Okeechobee, Florida	5985 _{am}	15440 _{am}
0000-0035	BRT, Brussels, Belgium	9925 _{na}	13675 _{sa}		0000-0100	WWCR Nashville, Tennessee	15690 _{am}	
0000-0100	All India Radio, Delhi	9535 _{as}	9910 _{as}	11715 _{as}	0000-0100	Radio Kiev, The Ukraine	7400 _{am}	9750 _{am} 15180 _{am}
		11745 _{as}	15110 _{as}				17690 _{am}	17720 _{am}
0000-0100	FEBC Radio Int'l, Philippines	15490 _{as}			0000-0100	Voice of America, Washington	5995 _{ca}	6130 _{ca} 9455 _{ca}
0000-0100	Radio Beijing, China	9770 _{am}	11655 _{am}	11715 _{am}			9775 _{ca}	9815 _{ca} 11580 _{ca}
		17705 _{am}					11695 _{ca}	
0000-0100	Christian Science World Service	7395 _{na}	9850 _{na}	13760 _{na}	0015-0030 m	Radio Prague, Czechoslovakia	7345 _{na}	9540 _{na} 11990 _{na}
0000-0100	Radio Havana Cuba	11820 _{am}			0030-0100 mtwhfa	Radio Budapest, Hungary	6110 _{am}	9520 _{am} 9585 _{am}
0000-0100	Radio Moscow World Service	7370 _{va}	17655 _{va}	17890 _{va}			9835 _{am}	11910 _{am} 15160 _{am}
0000-0100	Radio Moscow N. American Svc.	6000 _{na}	6045 _{na}	7115 _{na}	0030-0100	BBC London, England	5975 _{va}	6005 _{va} 6175 _{va}
		7150 _{na}	9685 _{na}	9765 _{na}			7325 _{va}	9580 _{va} 9670 _{va}
		17700 _{na}					9915 _{va}	11750 _{va} 11945 _{va}
0000-0100	R. Korea, Seoul, South Korea	15575 _{na}			0030-0100	HCJB Quito, Ecuador	11955 _{va}	12095 _{va} 15070 _{va}
0000-0100	Radio Luxembourg	6090 _{om}	15350 _{om}				15260 _{va}	15360 _{va} 15070 _{va}
0000-0100 smtwhf	Radio New Zealand Int'l	17770 _{pa}			0030-0100	Radio Australia, Melbourne	9745 _{am}	15155 _{am} 21455 _{am}
0000-0100	Radio Pyongyang, North Korea	11335 _{na}	13760 _{na}	15115 _{na}			25950 _{am}	
0000-0100	Radio Sofia, Bulgaria	9700 _{am}	11680 _{am}		0030-0100	Radio Netherlands, Hilversum	11880 _{va}	13605 _{va} 15240 _{va}
0000-0100	RTV Malaysia, Radio 4	7295 _{do}			0030-0100	Sri Lanka B'casting Corp.	15465 _{va}	17630 _{va} 17750 _{va}
					0050-0100	Vatican Radio, Vatican City	17795 _{va}	17855 _{va} 21740 _{va}
							6020 _{am}	6165 _{am} 15560 _{am}
							6005 _{as}	9720 _{as} 15425 _{as}
							6150 _{na}	9605 _{na}

PROGRAMS**Sundays**

- 0010 Kol Israel: Spotlight. People and issues in the news.
- 0015 Radio Beijing: Press Clippings. A review of the Chinese press.
- 0020 Radio Beijing: Travel Talk. An armchair tour of scenic spots in Chinese provinces.
- 0028 Radio Beijing: Cooking Show. The Beijing Frugal Gourmet.
- 0030 BBC: The Ken Bruce Show. A mix of popular music and entertainment news.
- 0035 Radio Beijing: Music from China. Chinese music, from traditional to pop.
- 0037 Radio Netherlands: Newline. News analysis from correspondents worldwide.
- 0050 Vatican Radio: With Heart and Mind. A look at the spiritual dimension of human living.
- 0052 Radio Netherlands: Over to You. Listener letters and questions, and music selections.



Aaron Orimian runs the Eastern Europe division of Kol Israel.

Monday

- 0010 Kol Israel: Calling All Listeners. A mailbag program.
- 0015 Radio Beijing: China Anthology. See S 1115.
- 0025 Kol Israel: DX Corner. Ben Dalfen presents DX news.
- 0025 Radio Beijing: Music Album. See S 1125.
- 0030 BBC: In Praise of God. A half-hour program of worship.
- 0030 Radio Netherlands: Happy Station. See S 1130.
- 0040 Radio Beijing: Listeners' Letterbox. See S 1140.
- 0050 Vatican Radio: The Pope, the Church, and the World. See S 0600.

Tuesdays

- 0010 Kol Israel: Israel Mosaic. See M 1110.
- 0015 Radio Beijing: Current Affairs. See M 1115.
- 0025 Kol Israel: Innovations. A look at science and technology in Israel.
- 0030 BBC: Megamix. A compendium of music, sport,

fashion, health, travel, news and views for young people.

- 0037 Radio Netherlands: Newline. See S 0037.
- 0040 Radio Beijing: Learn to Speak Chinese. See M 1140.
- 0050 Vatican Radio: A Many-Splendored Thing (except March 26th: Letterbox). See M 0600.
- 0052 Radio Netherlands: The Research File. See M 1152.

Wednesdays

- 0010 Kol Israel: Talking Point. See T 1110.
- 0015 Radio Beijing: Current Affairs. See M 1115.
- 0025 Kol Israel: Communicating. The media scene in Israel.
- 0030 BBC: Omnibus. See T 1615.
- 0037 Radio Netherlands: Newline. See S 0037.
- 0040 Radio Beijing: Listeners' Letterbox. See S 1140.
- 0050 Vatican Radio: Talking Point. See T 0600.
- 0052 Radio Netherlands: Images. See T 1152.

Thursdays

- 0010 Kol Israel: Jewish News Review. A look at events affecting followers of Judaism.
- 0015 Kol Israel: Living Here. People who have made Israel their home.
- 0015 Radio Beijing: Current Affairs. See M 1115.
- 0030 BBC: Comedy (except March 28th: Two Cheers for March). See W 1530.
- 0037 Radio Netherlands: Newline. See S 0037.
- 0040 Radio Beijing: Learn to Speak Chinese. See M 1140.
- 0050 Vatican Radio: Vatican Week. See W 0600.
- 0052 Radio Netherlands: Feature. See W 1152.

Fridays

- 0010 Kol Israel: This Land. See W 1110.
- 0015 Radio Beijing: Current Affairs. See M 1115.
- 0030 BBC: The Story of Western Music. The history of Western music from 800 to 1600 (except March 22nd, 29th: Music Feature, musical programming on various subjects).

- 0037 Radio Netherlands: Newline. See S 0037.
- 0040 Radio Beijing: Culture in China. See H 1140.
- 0050 Vatican Radio: Vatican Viewpoint. See H 0600.
- 0052 Radio Netherlands: Media Network. See H 1152.

Saturdays

- 0010 Kol Israel: Letter from Jerusalem. Arie Haskel presents commentary on topical issues.
- 0015 Kol Israel: Thank Goodness It's Friday. See F 1110.
- 0015 Radio Beijing: Current Affairs or The Business Show. See F 1115.
- 0030 BBC: From the Weeklies. A review of the weekly British press.
- 0037 Radio Netherlands: Newline. See S 0037.
- 0040 Radio Beijing: In the Third World. See F 1140.
- 0045 BBC: Recording of the Week. See M 0545.
- 0050 Vatican Radio: The Church Today. See F 0600.
- 0052 Radio Netherlands: Rembrandt Express. Pete Myers presents a magazine program.

0100 UTC**[8:00 PM EST/5:00 PM PST]****FREQUENCIES**

0100-0105	Vatican Radio, Vatican City	6150 _{na}	9605 _{na}
0100-0115	All India Radio, Delhi	9535 _{as}	9910 _{as} 11715 _{as}
		11745 _{as}	15110 _{as}
0100-0120	RAI, Rome, Italy	9575 _{am}	11800 _{am}
0100-0125	Kol Israel, Jerusalem	7495 _{na}	9435 _{na} 11605 _{na}
0100-0125	Radio Netherlands, Hilversum	6020 _{am}	6165 _{am} 15560 _{am}
0100-0130	Nat'l Radio of Laos, Vientiane	7112 _{as}	
0100-0130	Radio Australia, Melbourne	11880 _{va}	15240 _{va} 15530 _{va}
		17630 _{va}	17750 _{va} 17795 _{va}
		17855 _{va}	21525 _{va} 21740 _{va}
		21775 _{va}	
0100-0130	Radio Prague, Czechoslovakia	5930 _{na}	7345 _{na} 9540 _{na}
0100-0130	Radio Sweden, Stockholm	9770 _{as}	
0100-0145	Radio Yugoslavia, Belgrade	9620 _{na}	11735 _{na}
0100-0150	Deutsche Welle, Koln, Germany	6040 _{na}	6085 _{na} 6145 _{na}
		6155 _{na}	9565 _{na} 11865 _{na}
		11890 _{na}	13610 _{na} 13770 _{na}
		15440 _{na}	
0100-0200	FEBC Radio Int'l, Philippines	15490 _{as}	
0100-0200	Radio Moscow World Service	7370 _{va}	17655 _{va} 17890 _{va}
0100-0200	Radio Moscow N. American Svc	6000 _{na}	6045 _{na} 7115 _{na}
		7150 _{na}	7310 _{na} 9765 _{na}
		9685 _{na}	17605 _{na}
0100-0200	Radio Havana Cuba	11820 _{am}	
0100-0200	Radio Luxembourg	6090 _{om}	15350 _{om}
0100-0200	smtwhf Radio New Zealand Int'l	17770 _{pa}	
0100-0200	Radio Thailand, Bangkok	4830 _{as}	9655 _{as} 11905 _{as}
0100-0200	smtwh RTV Malaysia, Radio 4	7295 _{do}	
0100-0200	SBC Radio 1, Singapore	5052 _{do}	11940 _{do}
0100-0200	WRNO New Orleans, Louisiana	7355 _{na}	
0100-0200	KVOH Los Angeles, California	17775 _{na}	
0100-0200	KTNB Salt Lake City, Utah	15590 _{na}	
0100-0200	Christian Science World Service	7395 _{na}	9850 _{na} 13760 _{na}
0100-0200	WYFR Okeechobee, Florida	6065 _{na}	9505 _{na} 9680 _{na}

0100-0200	WINB Red Lion, Pennsylvania	15440 _{na}	
0100-0200	WWCR Nashville, Tennessee	15145 _{na}	
0100-0200	BBC London, England	7520 _{na}	
		5965 _{va}	5975 _{va} 6175 _{va}
		7325 _{va}	9580 _{va} 9590 _{va}
		9915 _{va}	11750 _{va} 11955 _{va}
		15260 _{va}	15280 _{va} 15360 _{va}
		21715 _{va}	
0100-0200	Radio Canada Int'l, Montreal	9535 _{ca}	11845 _{sa} 11940 _{sa}
		13720 _{ca}	
0100-0200	Spanish Foreign Radio, Madrid	9630 _{na}	11880 _{na}
0100-0200	HCJB Quilo, Ecuador	9745 _{am}	15155 _{am} 21455 _{am}
		25950 _{am}	
0100-0200	SLBS, Freetown, Sierra Leone	3316 _{do}	
0100-0200	Sri Lanka B'casting Corp.	6005 _{as}	9720 _{as} 15425 _{as}
0100-0200	Voice of America, Washington	6095 _{va}	6125 _{va} 7115 _{as}
		7205 _{as}	9740 _{va} 11705 _{as}
		11805 _{va}	15225 _{va} 15250 _{as}
		15405 _{va}	17740 _{as} 21550 _{as}
0100-0200	Voice of America, Washington	5995 _{ca}	6130 _{ca} 9455 _{ca}
		9775 _{ca}	9815 _{ca} 11580 _{ca}
		15205 _{ca}	
0100-0200	Voice of Indonesia, Jakarta	11752 _{as}	11785 _{as}
0130-0140	mtwhfa Voice of Greece, Athens	9395 _{am}	9420 _{am} 11645 _{am}
0130-0200	Peace & Progress, Moscow, USSR	7400 _{na}	9750 _{na} 15180 _{na}
		17690 _{na}	17720 _{na}
0130-0200	Radio Australia, Melbourne	11880 _{va}	15160 _{va} 15240 _{va}
		15530 _{va}	17630 _{va} 17750 _{va}
		17795 _{va}	17855 _{va} 17890 _{va}
		21525 _{va}	21740 _{va} 21775 _{va}
0130-0200	Radio Austria Int'l, Vienna	9870 _{sa}	9875 _{sa} 13730 _{na}
0130-0200	United Arab Emirates R., Dubai	11795 _{na}	13695 _{eu} 15320 _{eu}
		15435 _{eu}	
0130-0200	Radio Budapest, Hungary	6110 _{am}	9520 _{am} 9585 _{am}
		9835 _{am}	11910 _{am} 15160 _{am}
0145-0200	Vatican Radio, Vatican City	7125 _{as}	9650 _{as} 11750 _{as}

PROGRAMS**Sundays**

- 0100 Radio Norway Int'l: Norway Today. A magazine program on issues and people affecting modern-day Norway.
- 0101 BBC: Play of the Week. Hour-long drama selections.
- 0110 Kol Israel: Spotlight. See S 0010.
- 0130 Radio Austria Int'l: Report from Austria. A magazine program, covering all aspects of Austrian life and events in the news, and opening with the latest news bulletin.

Mondays

- 0100 Radio Norway Int'l: Norway Today. See S 0100.
- 0101 BBC: Feature/Drama. Program details to be announced.
- 0110 Kol Israel: Israel Sound. The latest tunes in pop and rock music from Israel.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0145 BBC: On The Record. What goes on behind the scenes in the music industry.

Tuesdays

- 0101 BBC: Outlook. See M 1405.
- 0110 Kol Israel: Calling All Listeners. See M 0010.
- 0125 BBC: Financial News. See M 2310.
- 0130 BBC: Personal View. See S 0445.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0145 BBC: Europe's World. A magazine program reflecting life in Europe and its links with other parts of the world.

Wednesdays

- 0101 BBC: Outlook. See M 1405.
- 0110 Kol Israel: Greetings From Israel. Listener record requests.
- 0125 BBC: Financial News. See M 2310.

- 0130 BBC: Talk. A short talk on any subject under the sun (except March 6th: Images of Britain, journalists from overseas comment on life in the UK).
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0145 BBC: Country Style. David Allan presents British country music.

Thursdays

- 0101 BBC: Outlook. See M 1405.
- 0110 Kol Israel: This Land. See W 1110.
- 0125 BBC: Financial News. See M 2310.
- 0130 BBC: Waveguide. See M 0530.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0140 BBC: Book Choice. See S 0225.
- 0145 BBC: The Farming World. Developments and issues in the world of agriculture.

Fridays

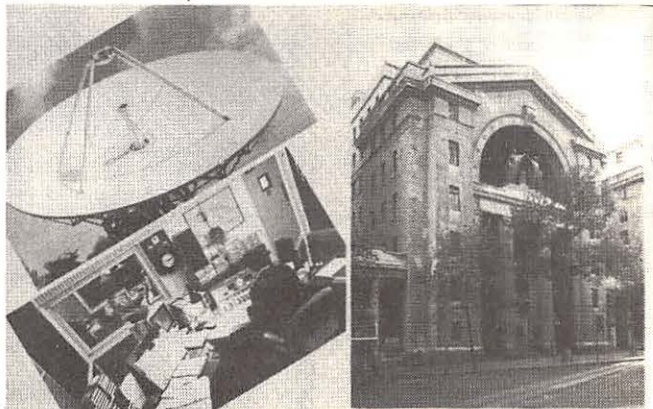
- 0101 BBC: Outlook. See M 1405.

Coverage of the Persian Gulf conflict has once again confirmed the BBC as the authoritative source of objective world news.

- 0110 Kol Israel: Studio Three. See H 1110.
- 0125 BBC: Financial News. See M 2310.
- 0130 BBC: Jazz Now and Then or Folk in Britain. See H 1345.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0145 BBC: Global Concerns. Issues of an environmental nature.

Saturdays

- 0100 Radio Norway Int'l: Norway Today. See S 0100.
- 0101 BBC: Outlook. See M 1405.
- 0110 Kol Israel: The Week in Review. A look back at the week just past, as reported in the Israeli press.
- 0125 BBC: Financial News. See M 2310.
- 0130 BBC: Short Story (except March 2nd: Seeing Stars). See S 1115.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0145 BBC: Here's Humph! All that jazz with Humphrey Lyttelton.



[9:00 PM EST/6:00 PM PST]

0200-0225	Kol Israel, Jerusalem	7495 _{na}	9435 _{na}	11605 _{na}
0200-0230	FEBC Radio Int'l, Philippines	15490 _{as}		
0200-0230	fa Radio Budapest, Hungary	6110 _{am}	9520 _{am}	9585 _{am}
		9835 _{am}	11910 _{am}	15160 _{am}
0200-0230	Radio Sweden, Stockholm	9695 _{na}	11705 _{na}	
0200-0230	Sri Lanka B'casting Corp.	6005 _{as}	9720 _{as}	15425 _{as}
0200-0230	Swiss Radio Int'l, Bern	6095 _{am}	6135 _{am}	9650 _{am}
		9885 _{am}	12035 _{am}	17730 _{am}
0200-0230	mtwhf Voice of America, Washington	5995 _{ca}	9775 _{ca}	9815 _{ca}
		11580 _{ca}	15205 _{ca}	
0200-0230	mtwhfa Voice of Kenya, Nairobi	6075 _{do}		
0200-0250	Deutsche Welle, Koln, Germany	6035 _{as}	7285 _{as}	9615 _{as}
		9690 _{as}	11945 _{as}	11965 _{as}
0200-0300	Radio Cairo, Egypt	9475 _{na}	9675 _{na}	
0200-0300	Radio Havana Cuba	9505 _{am}	11820 _{am}	
0200-0300	Radio Australia, Melbourne	11880 _{pa}	15160 _{pa}	15240 _{as}
		15530 _{as}	17630 _{va}	17750 _{as}
		17795 _{pa}	17855 _{va}	21525 _{va}
		21740 _{na}	21775 _{na}	
0200-0300	HCJB Quito, Ecuador	9745 _{na}	15155 _{na}	17875 _{sa}
0200-0300	WRNO New Orleans, Louisiana	7355 _{am}		
0200-0300	KTBN Salt Lake City, Utah	7510 _{am}		
0200-0300	WHRI Noblesville, Indiana	7315 _{na}	9495 _{sa}	
0200-0300	WINB Red Lion, Pennsylvania	15145 _{eu}		
0200-0300	WWCR Nashville, Tennessee	7520 _{na}		
0200-0300	WYFR Okeechobee, Florida	6065 _{na}	9505 _{na}	
0200-0300	Radio Luxembourg	6090 _{om}	15350 _{om}	
0200-0300	m Radio New York Int'l, (via WWCR)	7435 _{va}		
0200-0300	smtwhf Radio New Zealand Int'l	17770 _{pa}		
0200-0300	BBC London, England	5975 _{va}	6005 _{va}	6175 _{va}

			7325 _{va}	9410 _{va}	9515 _{va}
			9590 _{va}	9915 _{va}	11750 _{va}
			12095 _{va}	15260 _{va}	15390 _{va}
			21715 _{va}		
0200-0300		Radio Romania Int'l, Bucharest	5990 _{am}	9510 _{am}	9570 _{am}
			11830 _{am}	11940 _{am}	15380 _{am}
0200-0300		Radio Thailand, Bangkok	4830 _{as}	9655 _{as}	11905 _{as}
0200-0300	smtwh	RTV Malaysia, Radio 4	7295 _{do}		
0200-0300		SBC Radio 1, Singapore	5052 _{do}	11940 _{do}	
0200-0300		SLBS, Freetown, Sierra Leone	3316 _{do}		
0200-0300		Radio Moscow N. American Svc	6000 _{na}	6045 _{na}	7115 _{na}
			7150 _{na}	7310 _{na}	9765 _{na}
			15425 _{na}	17700 _{na}	
0200-0300		Radio Moscow World Service	7370 _{va}		
0200-0300		Christian Science World Service	9465 _{eu}	9850 _{eu}	13720 _{eu}
			13760 _{eu}		
0200-0300		Voice of America, Washington	5965 _{va}	6125 _{va}	7115 _{as}
			7205 _{as}	9740 _{va}	11705 _{as}
			11805 _{va}	15225 _{va}	15250 _{as}
			17740 _{as}	17895 _{va}	21550 _{as}
0200-0300		Voice of Free China, Taiwan	5950 _{na}	9680 _{na}	9765 _{pa}
			11740 _{ca}	11860 _{as}	15345 _{as}
0230-0300		Sri Lanka B'casting Corp.	9720 _{as}	15425 _{as}	
0230-0245	twfa	Radio Budapest, Hungary	6110 _{am}	9520 _{am}	9585 _{am}
			9835 _{am}	11910 _{am}	15160 _{am}
0230-0245		Radio Pakistan, Islamabad	9545 _{as}	15115 _{as}	17640 _{as}
			17725 _{as}	21730 _{as}	
0230-0300	war	Radio Baghdad, Iraq	11810 _{na}	11830 _{as}	
0230-0300		Radio Tirana, Albania	9760 _{na}	11825 _{na}	
0230-0300	s	Voice of Kenya, Nairobi	6075 _{do}		
0240-0300		Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	

0200 Radio Norway Int'l: Norway Today. See S 0100.
0208 Swiss Radio Int'l: Dateline. World news, commentary, and analysis of current affairs.
0209 BBC: British Press Review. Editorial opinion in the British press.
0210 Kol Israel: Spotlight. See S 0010.
0215 BBC: They Made Our World. Scientists who shaped the future of mankind.
0218 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. Bob Thomann and Bob Zanotti present DX news and advice.
0225 BBC: Book Choice. Short reviews of current or future best-sellers.
0230 BBC: Feature. Topical programming on various subjects (except March 3rd: The Jews of Eastern Europe, developments in Jewish life amid

profound changes in Eastern Europe).

0200 Radio Norway Int'l: Norway Today. See S 0100.
0208 Swiss Radio Int'l: Feature. See S 0638.
0209 BBC: British Press Review. See S 0209.
0210 Kol Israel: Calling All Listeners. See M 0010.
0215 BBC: Andy Kershaw's World of Music. Exotic and innovative music from the world over.
0230 BBC: Composer of the Month. A month-long series on a particular classical music composer.

0208 Swiss Radio Int'l: Dateline. See S 0208.
0209 BBC: British Press Review. See S 0209.
0210 Kol Israel: Israel Mosaic. See M 1110.
0215 BBC: Network UK. A look at the issues and events that affect the lives of people throughout the UK.
0230 BBC: Sports International. Feature program on a

topic or person making sports headlines.

0208 Swiss Radio Int'l: Dateline. See S 0208.
0209 BBC: British Press Review. See S 0209.
0210 Kol Israel: Talking Point. See T 1110.
0215 BBC: Health Matters. See M 1115.
0230 BBC: Stone's America. A rerun of Leslie Stone's popular series sampling life across the USA.

0208 Swiss Radio Int'l: Dateline. See S 0208.
0209 BBC: British Press Review. See S 0209.
0210 Kol Israel: Living Here. See H 0010.
0215 BBC: Network UK. See T 0215.
0230 BBC: Assignment. Examinations of current topical issues.

0208 Swiss Radio Int'l: Dateline. See S 0208.
0209 BBC: British Press Review. See S 0209.
0210 Kol Israel: This Land. See W 1110.
0215 BBC: Seven Seas. A weekly program about ships
and the sea.
0230 BBC: Drama. See H 1130.

0200 Radio Norway Int'l: Norway Today. See S 0100.
0208 Swiss Radio Int'l: Dateline. See S 0208.
0209 BBC: British Press Review. See S 0209.
0210 Kol Israel: Thank Goodness It's Friday. See F
1110.
0215 BBC: Network UK. See T 0215.
0230 BBC: People and Politics. Background to the
British political scene.



0300 UTC

[10:00 PM EST/7:00 PM PST]

FREQUENCIES

0300-0330	Radio Cairo, Egypt	9475 _{na}	9675 _{na}	
0300-0330	Radio Japan, Tokyo	5960 _{na}	15325 _{na}	17825 _{na}
		21610 _{na}		
0300-0330	Radio Australia, Melbourne	11880 _{pa}	15160 _{pa}	15240 _{pa}
		15530 _{as}	17630 _{as}	17750 _{pa}
		17795 _{as}	17855 _{va}	21525 _{va}
		21740 _{na}	21775 _{na}	
0300-0330	Radio Prague, Czechoslovakia	5930 _{na}	7345 _{na}	9540 _{na}
0300-0330	Voice of America, Washington	5965 _{va}	11905 _{va}	15160 _{va}
		17810 _{va}	17895 _{va}	
0300-0350	Deutsche Welle, Koln, Germany	6040 _{na}	6085 _{na}	6120 _{na}
		9545 _{na}	9605 _{na}	11890 _{na}
		13610 _{na}	13770 _{na}	15440 _{na}
0300-0400	Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	
0300-0400	WAR Radio Baghdad, Iraq	11810 _{na}	11830 _{as}	
0300-0400	Radio Beijing, China	9690 _{am}	9770 _{am}	11715 _{am}
0300-0400	Radio Havana Cuba	9505 _{am}	11820 _{am}	
0300-0400	BBC London, England	5975 _{va}	6175 _{va}	7325 _{va}
		9410 _{va}	9600 _{va}	9915 _{va}
		11750 _{va}	12095 _{va}	15260 _{va}
		21715 _{va}		
0300-0400	Radio Luxembourg	15350 _{om}		
0300-0400	M Radio New York Int'l, (via WCCR)	7435 _{va}		
0300-0400	SMTWHF Radio New Zealand Int'l	17770 _{pa}		
0300-0400	Radio Tanzania, Dar es Salaam	5985 _{af}	9685 _{af}	11765 _{af}
0300-0400	Radio Thailand, Bangkok	4830 _{as}	9655 _{as}	11905 _{as}
0300-0400	HCJB Quito, Ecuador	9745 _{na}	15155 _{na}	21545 _{sa}
		25950 _{am}		
0300-0400	WRNO New Orleans, Louisiana	7355 _{am}		
0300-0400	KTBN Salt Lake City, Utah	7510 _{am}		
0300-0400	WHRI Noblesville, Indiana	7315 _{na}	9495 _{sa}	

	BBC, London, England			
	Christian Science World Service			
0300-0400	WCCR Nashville, Tennessee	7520 _{na}		
0300-0400	WYFR Okeechobee, Florida	6065 _{na}	9505 _{na}	
0300-0400	Radio Moscow North American	59000 _{na}	6045 _{na}	7115 _{na}
		7150 _{na}	7310 _{na}	9685 _{na}
		9765 _{na}	15425 _{na}	17700 _{na}
		17775 _{va}	17825 _{va}	17890 _{va}
0300-0400	Radio Moscow World Service	17775 _{va}		
0300-0400	SMTWH RTV Malaysia, Radio 4	7295 _{do}		
0300-0400	SBC Radio 1, Singapore	5052 _{do}	11940 _{do}	
0300-0400	SLBS, Freetown, Sierra Leone	3316 _{do}		
0300-0400	Sri Lanka B'casting Corp.	9720 _{as}	15425 _{as}	
0300-0400	Voice of America, Washington	6035 _{af}	9575 _{af}	9585 _{af}
		9655 _{af}	11835 _{af}	15350 _{af}
		17715 _{af}	21600 _{af}	
0300-0400	Voice of Free China, Taiwan	5950 _{na}	9680 _{na}	9765 _{as}
		11745 _{as}	15345 _{as}	
0300-0400	Voice of Kenya, Nairobi	6075 _{do}		
0310-0325	Vatican Radio, Vatican City	9635 _{na}		
0325-0400	MTWHFA Zimbabwe B'casting Corp., Harare	3396 _{do}		
0330-0400	Radio Netherlands, Hilversum	9590 _{am}	11720 _{am}	
0330-0400	Radio Sweden, Stockholm	9695 _{na}	11705 _{na}	
0330-0400	Radio Tirana, Albania	9760 _{na}	11825 _{na}	
0300-0400	Radio Australia, Melbourne	11880 _{pa}	15160 _{pa}	15240 _{as}
		15530 _{va}	17630 _{va}	17750 _{pa}
		17795 _{pa}	17855 _{va}	21525 _{va}
		21775 _{va}		
0330-0400	UAE Radio, Dubai, United Arab Emirates	11945 _{na}	13675 _{na}	15400 _{na}
		15435 _{na}		
0340-0345	MTWHFA Voice of Greece, Athens	9395 _{am}	9420 _{am}	11645 _{am}
0350-0400	RAI, Rome, Italy	11905 _{as}	15330 _{as}	17795 _{as}
0355-0400	Voice of Turkey, Ankara	9445 _{na}	17760 _{pa}	

PROGRAMS

Sundays

- 0310 Vatican Radio: With Heart and Mind. See S 0050.
 0315 BBC: Society Today. A weekly look at changes in Britain.
 0315 Radio Beijing: Press Clippings. See S 0015.
 0320 Radio Beijing: Travel Talk. See S 0020.
 0328 Radio Beijing: Cooking Show. See S 0028.
 0330 BBC: From Our Own Correspondent. In-depth news stories from correspondents worldwide.
 0335 Radio Beijing: Music from China. See S 0035.
 0337 Radio Netherlands: Newslines. See S 0037.
 0350 BBC: Write On.... Paddy Feeny presents listener letters.
 0352 Radio Netherlands: Over to You. See S 0052.

Mondays

- 0310 Vatican Radio: The Pope, the Church, and the World. See S 0600.
 0315 BBC: Good Books. A recommendation of a book to read.
 0315 Radio Beijing: China Anthology. See S 1115.
 0325 Radio Beijing: Music Album. See S 1125.
 0330 BBC: Anything Goes. See S 1430.
 0330 Radio Netherlands: Happy Station. See S 1130.
 0340 Radio Beijing: Listeners' Letterbox. See S 1140.

Tuesdays

- 0310 Vatican Radio: A Many-Splendored Thing (except March 26th: Letterbox). See M 0600.
 0315 BBC: The World Today. See M 1645.
 0315 Radio Beijing: Current Affairs. See M 1115.
 0330 BBC: John Peel. Tracks from newly released albums and singles from the contemporary music scene.
 0337 Radio Netherlands: Newslines. See S 0037.



Lars Rooth may not be Larry Magne, but he is Vatican Radio's resident technical expert.

- 0340 Radio Beijing: Learn to Speak Chinese. See M 1140.
 0352 Radio Netherlands: The Research File. See M 1152.

Wednesdays

- 0310 Vatican Radio: Talking Point. See T 0600.
 0315 BBC: The World Today. See M 1645.
 0315 Radio Beijing: Current Affairs. See M 1115.
 0330 BBC: Discovery. An in-depth look at scientific research.
 0337 Radio Netherlands: Newslines. See S 0037.
 0340 Radio Beijing: Listeners' Letterbox. See S 1140.
 0352 Radio Netherlands: Images. See T 1152.

Thursdays

- 0310 Vatican Radio: Vatican Week. See W 0600.
 0315 BBC: The World Today. See M 1645.
 0315 Radio Beijing: Current Affairs. See M 1115.
 0330 BBC: Ned Sherrin's Counterpoint. See M 1215.
 0337 Radio Netherlands: Newslines. See S 0037.
 0340 Radio Beijing: Learn to Speak Chinese. See M 1140.
 0352 Radio Netherlands: Feature. See W 1152.

Fridays

- 0310 Vatican Radio: Vatican Viewpoint. See H 0600.
 0315 BBC: The World Today. See M 1645.
 0315 Radio Beijing: Current Affairs. See M 1115.
 0330 BBC: Focus on Faith. Comment and discussion on the major issues in the worlds of faith.
 0337 Radio Netherlands: Newslines. See S 0037.
 0340 Radio Beijing: Culture in China. See H 1140.
 0352 Radio Netherlands: Media Network. See H 1152.

Saturdays

- 0310 Vatican Radio: The Church Today. See F 0600.
 0315 BBC: The World Today. See M 1645.
 0315 Radio Beijing: Current Affairs or The Business Show. See F 1115.
 0330 BBC: The Vintage Chart Show. Paul Burnett presents top ten hits from the music charts of yesteryear.
 0337 Radio Netherlands: Newslines. See S 0037.
 0340 Radio Beijing: In the Third World. See F 1140.
 0352 Radio Netherlands: Rembrandt Express. See A 0052.

0400 UTC**[11:00 PM EST/8:00 PM PST]****FREQUENCIES**

0400-0410	RAI, Rome, Italy	11905 _{as}	15330 _{as}	17795 _{as}
0400-0415	Radio Prague, Czechoslovakia	5930 _{na}	7345 _{na}	9540 _{na}
0400-0425	Radio Netherlands, Hilversum	9590 _{am}	11720 _{am}	
0400-0430 war	Radio Baghdad, Iraq	11810 _{na}	11830 _{as}	
0400-0430	Radio Romania Int'l, Bucharest	5990 _{am}	9510 _{am}	9570 _{am}
		11830 _{am}	11940 _{am}	15380 _{am}
0400-0430	Radio Tanzania, Dar es Salaam	5985 _{af}	9685 _{af}	11765 _{af}
0400-0430	Radio Thailand, Bangkok	4830 _{as}	9655 _{as}	11905 _{as}
0400-0430	Sri Lanka B'casting Corp.	9720 _{as}	15425 _{as}	
0400-0430	Swiss Radio Int'l, Bern	6135 _{am}	9650 _{am}	9885 _{am}
		12035 _{am}		
0400-0430	Voice of America, Washington	6035 _{af}	9575 _{af}	11835 _{af}
		15350 _{af}	17715 _{af}	21600 _{af}
0400-0450	Deutsche Welle, Köln, Germany	6040 _{af}	7150 _{af}	7225 _{af}
		9565 _{af}	9765 _{af}	11763 _{af}
		11890 _{af}	13610 _{af}	13770 _{af}
		13965 _{af}	15265 _{af}	15440 _{af}
0400-0450	Radio Havana Cuba	9505 _{am}	9750 _{am}	11760 _{am}
		11820 _{am}		
0400-0500	BBC London, England	5975 _{va}	6175 _{va}	6195 _{va}
		7120 _{va}	9410 _{va}	9600 _{va}
		9610 _{va}	9915 _{va}	12095 _{va}
		15070 _{va}	15280 _{va}	15400 _{va}
		15420 _{va}		
0400-0500	Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	
0400-0500	Radio Beijing, China	11695 _{am}		
0400-0500	HCJB Quito, Ecuador	9745 _{na}	15155 _{na}	
0400-0500	WRNO New Orleans, Louisiana	6185 _{am}		
0400-0500	KVOH Los Angeles, California	9785 _{am}		
0400-0500	KTBN Salt Lake City, Utah	7510 _{am}		
0400-0500	WHRI Noblesville, Indiana	7315 _{na}	9495 _{sa}	
0400-0500	Radio Australia, Melbourne	11880 _{va}	15160 _{va}	15240 _{va}
		15320 _{va}	15530 _{va}	17750 _{va}

		17795 _{va}	17855 _{va}	21525 _{va}
		21775 _{va}		
0400-0500	Christian Science World Service	9455 _{eu}	9840 _{eu}	13720 _{eu}
		13760 _{eu}		
0400-0500	WWCR Nashville, Tennessee	7520 _{na}		
0400-0500	WYFR Okeechobee, Florida	6065 _{na}	9505 _{na}	
0400-0500	Radio Luxembourg	15350 _{om}		
0400-0500	Radio Moscow N.American Svc	15180 _{na}	17700 _{na}	
0400-0500	Radio Moscow World Service	7150 _{va}	7310 _{va}	7420 _{va}
		9685 _{va}	9750 _{va}	9765 _{va}
		9895 _{va}	15420 _{va}	17570 _{va}
		17590 _{va}	17610 _{va}	17655 _{va}
		17775 _{va}	17825 _{va}	17890 _{va}
		21790 _{va}		
0400-0500 m	Radio New York Int'l, (via WWCR)	7435 _{va}		
0400-0500 smtwhf	Radio New Zealand Int'l	17770 _{pa}		
0400-0500	Radio Pyongyang, North Korea	15180 _{as}	15230 _{as}	17765 _{as}
0400-0500	Radio Sofia, Bulgaria	7115 _{am}	9700 _{am}	
0400-0500	Radio Sofia, Bulgaria	11735 _{af}	11765 _{af}	15160 _{af}
0400-0500	Radio RSA, South Africa	7270 _{af}	11900 _{af}	11920 _{af}
0400-0500 smtwh	RTV Malaysia, Radio 4	7295 _{do}		
0400-0500	SBC Radio 1, Singapore	5052 _{do}	11940 _{do}	
0400-0500	SLBS, Freetown, Sierra Leone	3316 _{do}		
0400-0500	Voice of America, Washington	5995 _{va}	6140 _{va}	7170 _{va}
		7200 _{va}	9715 _{va}	
0400-0500	Voice of Kenya, Nairobi	6075 _{do}		
0400-0500	Voice of Turkey, Ankara	9445 _{na}	17760 _{pa}	
0400-0500 mtwhfa	Zimbabwe BC Corp., Harare	3396 _{do}		
0400-0425	RAI, Rome, Italy	5990 _{me}	7275 _{me}	
0430-0500	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
0430-0500 mtwhf	Radio Southwest Africa, Namibia	3270 _{af}	3290 _{af}	
0430-0500	Radio Tirana, Albania	9480 _{af}	11835 _{af}	
0430-0500 s	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}
0430-0500	Voice of America, Washington	6035 _{af}	9575 _{af}	15350 _{af}
		17715 _{af}	17755 _{af}	21600 _{af}
0450-0500	Radio Havana Cuba	9750 _{am}	11760 _{am}	11820 _{am}

PROGRAMSSundays

0408 Swiss Radio Int'l: Dateline. See S 0208.
 0415 Radio Beijing: Press Clippings. See S 0015.
 0418 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.
 0420 Radio Beijing: Travel Talk. See S 0020.
 0428 Radio Beijing: Cooking Show. See S 0028.
 0430 BBC: A Taste of Soul. Robbie Vincent presents the best of the British soul and dance scene.
 0435 Radio Beijing: Music from China. See S 0035.
 0445 BBC: Personal View. A personal opinion on topical issues in British life.

Mondays

0408 Swiss Radio Int'l: Feature. See S 0638.

0415 Radio Beijing: China Anthology. See S 1115.
 0425 Radio Beijing: Music Album. See S 1125.
 0430 BBC: Off the Shelf. A reading selected from the best of world literature.
 0440 Radio Beijing: Listeners' Letterbox. See S 1140.
 0445 BBC: Talk. A short talk on any subject under the sun (except March 4th, 11th: Backing the Canvas, what goes on behind the scenes in the art sales industry).

Tuesdays

0408 Swiss Radio Int'l: Dateline. See S 0208.
 0415 Radio Beijing: Current Affairs. See M 1115.
 0430 BBC: Off the Shelf. See M 0430.
 0440 Radio Beijing: Learn to Speak Chinese. See M 1140.
 0445 BBC: Europe's World. See T 0145.

Wednesdays

0408 Swiss Radio Int'l: Dateline. See S 0208.
 0415 Radio Beijing: Current Affairs. See M 1115.
 0430 BBC: Off the Shelf. See M 0430.
 0440 Radio Beijing: Listeners' Letterbox. See S 1140.
 0445 BBC: Country Style. See W 0145.

Thursdays

0408 Swiss Radio Int'l: Dateline. See S 0208.
 0415 Radio Beijing: Current Affairs. See M 1115.
 0430 BBC: Off the Shelf. See M 0430.
 0440 Radio Beijing: Learn to Speak Chinese. See M 1140.
 0445 BBC: Andy Kershaw's World of Music. See M 0215.

Fridays

0408 Swiss Radio Int'l: Dateline. See S 0208.
 0415 Radio Beijing: Current Affairs. See M 1115.
 0430 BBC: Off the Shelf. See M 0430.
 0440 Radio Beijing: Culture in China. See H 1140.
 0445 BBC: Jazz Now and Then or Folk in Britain. See H 1345.

Saturdays

0408 Swiss Radio Int'l: Dateline. See S 0208.
 0415 Radio Beijing: Current Affairs or The Business Show. See F 1115.
 0430 BBC: Here's Humph! See A 0145.
 0440 Radio Beijing: In the Third World. See F 1140.
 0445 BBC: Worldbrief. See F 2315.

Radio Beijing's Fan Huiqiang sending home a satellite report on Premier Zhao Ziyang's visit to Sweden.



0500 UTC**[12:00 PM EST/9:00 PM PST]****FREQUENCIES**

0500-0510	Radio Lesotho, Maseru	4800do		
0500-0510 w	Malawi B'casting, Blantyre	3381do		
0500-0515	Kol Israel, Jerusalem	7410na	7495na	9435na
		11605na	17575as	
0500-0530	Vatican Radio, Vatican City	17710af	17730af	21650af
0500-0530	mtwhf Zimbabwe B'casting, Harare	3396do		
0500-0545	smtwhf Radio New Zealand Int'l	17770pa		
0500-0550	Deutsche Welle, Koln, Germany	5960na	6120na	9760na
		9700na	11890na	13610na
		13770na	15440na	
0500-0600	Christian Science World Service	9455eu	9840eu	13720eu
		13760eu		
0500-0600	Radio 2, Lusaka, Zambia	6165do	7235do	
0500-0600	Spanish Foreign Radio, Madrid	9630na		
0500-0600	Radio Beijing, China	11840am		
0500-0600 sa	Radio East Africa, Equatorial Guinea	9585af		
0500-0600	Radio Havana Cuba	9750am	11760am	11820am
0500-0600	Radio Luxembourg	15350om		
0500-0600 m	Radio New York Int'l, (via WWCR)	7435va		
0500-0600	Radio Nigeria, Lagos	3326do	4990do	
0500-0600	Radio Southwest Africa, Namibia	3270af	3290af	
0500-0600	HCJB Quito, Ecuador	9745na	15155na	
0500-0600	WRNO New Orleans, Louisiana	6185am		
0500-0600	KTNB Salt Lake City, Utah	7510am		
0500-0600	KVOH Los Angeles, California	9785am		
0500-0600	WHRI Noblesville, Indiana	7315na	9495sa	
0500-0600	WINB Red Lion, Pennsylvania	15145eu		
0500-0600	WWCR Nashville, Tennessee	7520na		
0500-0600	Radio Moscow N. American Svct	5180na		
0500-0600	Radio Australia, Melbourne	11880va	15160va	15240va
		15320va	15530va	17630va
		17750va	17795va	17855va

0500-0600	Radio Moscow World Service	21525va	21775va	
0500-0600	WYFR Okeechobee, Florida	7130va	7150va	
0500-0600	Radio Thailand, Bangkok	9505na	11915am	
0500-0600 s	Radio Zambia Int'l, Lusaka ¹	4830as	9655as	11905as
0500-0600	RTV Malaysia, Radio 4	9505af	11880af	17895af
0500-0600	SBC Radio 1, Singapore	7295do		
0500-0600	SLBS, Freetown, Sierra Leone	5052do	11940do	
0500-0600	Voice of America, Washington	3316do		
		6035af	9575af	15350af
0500-0600	Voice of America, Washington	17715af		
		5995va	6060va	6140va
		7170va	7200va	9670va
		9700va	9715va	11825va
		15205va		
0500-0600	BBC London, England	5975va	6195va	7120va
		9410va	9600va	9640va
		9915va	12095va	17885va
0500-0600	Voice of Kenya, Nairobi	6075do		
0500-0600	Voice of Nigeria, Lagos	7255af		
0510-0515 w	Radio Botswana, Gaborone	5955af	7255af	
0524-0600 f	Radio 2, Accra, Ghana	3366do		
0526-0600	Radio 1, Accra, Ghana ¹	4915do		
0530-0600	Cameroon Radio-TV, Yaounde	4850do		
0530-0600	Radio Austria Int'l, Vienna	6015na	6155eu	13730eu
		15410me	21490me	
0530-0600	Radio Romania Int'l, Bucharest	15340af	15380af	17720af
		17745af	17790af	21665af
0530-0600	UAE Radio, Dubai, United Arab Emirates	15435as	17830as	21700as
0530-0600	mtwhf Zimbabwe B'casting, Harare	3396do	7283do	
0545-0600	Radio Buea, Cameroon ¹	3970do		
0545-0600	smtwhf Radio New Zealand Int'l	17770pa	9700-Sat. only	
0555-0600	Voice of Malaysia, Kuala Lumpur	6175as	9750as	15295as

PROGRAMS**Sundays**

0509 BBC: Twenty-Four Hours. Analysis of the main news of the day.

0515 Radio Beijing: Press Clippings. See S 0015.

0520 Radio Beijing: Travel Talk. See S 0020.

0528 Radio Beijing: Cooking Show. See S 0028.

0530 BBC: Financial Review. A look back at the financial week.

0530 Radio Austria Int'l: Report from Austria. See S 0130.

0535 Radio Beijing: Music from China. See S 0035.

0540 BBC: Words of Faith. People share how their scripture gives meaning to their lives.

0545 BBC: Letter from America. Alistair Cooke's distinctly British view of America.

Mondays

0509 BBC: Twenty-Four Hours. See S 0509.

0515 Radio Beijing: China Anthology. See S 1115.

0525 Radio Beijing: Music Album. See S 1125.

0530 BBC: Waveguide. How to hear the BBC better.

0530 Radio Austria Int'l: Report from Austria. See S 0130.

0540 BBC: Words of Faith. See S 0540.

0540 Radio Beijing: Listeners' Letterbox. See S 1140.

0545 BBC: Recording of the Week. A personal choice from the latest classical music releases.

Tuesdays

0509 BBC: Twenty-Four Hours. See S 0509.

0515 Radio Beijing: Current Affairs. See M 1115.

0530 BBC: Financial News. See M 2310.

0530 Radio Austria Int'l: Report from Austria. See S 0130.

0540 BBC: Words of Faith. See S 0540.

0540 Radio Beijing: Learn to Speak Chinese. See M 1140.

0545 BBC: The World Today. See M 1645.

Wednesdays

0509 BBC: Twenty-Four Hours. See S 0509.

0515 Radio Beijing: Current Affairs. See M 1115.

0530 BBC: Financial News. See M 2310.

0530 Radio Austria Int'l: Report from Austria. See S 0130.

0540 BBC: Words of Faith. See S 0540.

0540 Radio Beijing: Listeners' Letterbox. See S 1140.

0545 BBC: The World Today. See M 1645.

Thursdays

0509 BBC: Twenty-Four Hours. See S 0509.

0515 Radio Beijing: Current Affairs. See M 1115.

0530 BBC: Financial News. See M 2310.

0530 Radio Austria Int'l: Report from Austria. See S 0130.

0540 BBC: Words of Faith. See S 0540.

0540 Radio Beijing: Learn to Speak Chinese. See M 1140.

0545 BBC: The World Today. See M 1645.

Fridays

0509 BBC: Twenty-Four Hours. See S 0509.

0515 Radio Beijing: Current Affairs. See M 1115.

0530 BBC: Financial News. See M 2310.

0530 Radio Austria Int'l: Report from Austria. See S 0130.

0540 BBC: Words of Faith. See S 0540.

0540 Radio Beijing: Culture in China. See H 1140.

0545 BBC: The World Today. See M 1645.

Saturdays

0509 BBC: Twenty-Four Hours. See S 0509.

0515 Radio Beijing: Current Affairs or The Business Show. See F 1115.

0530 BBC: Financial News. See M 2310.

0530 Radio Austria Int'l: Report from Austria. See S 0130.

0540 BBC: Words of Faith. See S 0540.

0540 Radio Beijing: In the Third World. See F 1140.

0545 BBC: The World Today. See M 1645.



John Tidmarsh has hosted the BBC magazine program "Outlook" since its inception in 1966.

0600 UTC**[1:00 AM EST/10:00 PM PST]****FREQUENCIES**

0600-0610 s	Malawi B'casting, Blantyre	3381 _{do}	
0600-0620	Vatican Radio, Vatican City	6185 _{eu}	6248 _{eu}
0600-0625	Cameroon Radio-TV, Yaounde	4850 _{do}	
0600-0625	Voice of Kenya, Nairobi	6075 _{do}	
0600-0630	Nat'l Radio of Laos, Vientiane	7112 _{as}	
0600-0630 smtwhf	Radio New Zealand Int'l	17770 _{pa}	9700-Sat. only
0600-0630	Radio Australia, Melbourne	11880 _{pa}	15240 _{pa} 15320 _{as}
		17630 _{pa}	17795 _{as} 17855 _{af}
		21525 _{na}	21775 _{na}
0600-0630 s	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af} 17895 _{af}
0600-0630	Voice of America, Washington	5995 _{va}	6060 _{va} 6095 _{va}
		6140 _{va}	7170 _{va} 7200 _{va}
		9670 _{va}	9700 _{va} 9715 _{va}
		11825 _{va}	15205 _{va}
0600-0645 s	Radio Douala, Cameroon	4795 _{do}	
0600-0650	Deutsche Welle, Koln, Germany	11765 _{af}	13610 _{af} 13790 _{af}
		15185 _{af}	15440 _{af} 17875 _{af}
		6280 _{me}	
0600-0700	King of Hope, Lebanon	4915 _{do}	
0600-0700	Radio 1, Accra, Ghana ¹	3366 _{do}	
0600-0700 f	Radio 2, Accra, Ghana	6165 _{do}	7235 _{do}
0600-0700	Radio 2, Lusaka, Zambia	9585 _{af}	
0600-0700 sa	R. East Africa, Equatorial Guinea	11835 _{am}	
0600-0700	Radio Havana Cuba	15350 _{om}	
0600-0700	Radio Luxembourg	3326 _{do}	4990 _{do}
0600-0700	Radio Nigeria, Lagos	15180 _{as}	15230 _{as}
0600-0700 sa	Radio Pyongyang, North Korea	4830 _{as}	9655 _{as} 11905 _{as}
0600-0700	Radio Thailand, Bangkok	7295 _{do}	
0600-0700 smtwha	RTV Malaysia, Radio 4	5052 _{do}	11940 _{do}
0600-0700	SBC Radio 1, Singapore	3316 _{do}	
0600-0700	SLBS, Freetown, Sierra Leone	5975 _{na}	6195 _{na} 7120 _{as}
0600-0700	BBC London, England	7150 _{as}	7230 _{pa} 9410 _{af}
		9600 _{af}	9640 _{af} 12095 _{eu}
		15070 _{eu}	15400 _{af} 17885 _{af}
		21660 _{as}	
0600-0700	Radio Moscow N. American Svc	17720 _{na}	

0600-0700	Radio Moscow World Service	7310 _{na}	12055 _{va}	13705 _{va}
		15280 _{va}	15295 _{va}	15455 _{va}
		15560 _{va}	17570 _{va}	17590 _{va}
		17600 _{va}	17610 _{va}	17675 _{va}
0600-0700	Christian Science World Service	9455 _{eu}	9840 _{eu}	11705 _{na}
		13720 _{eu}		
0600-0700	WYFR Okeechobee, Florida	5985 _{na}	7355 _{eu}	9680 _{na}
		13695 _{eu}		
0600-0700	WHRI Noblesville, Indiana	7315 _{eu}	949 _{sa}	
0600-0700	WWCR Nashville, Tennessee	7520 _{na}		
0600-0700 smtwhf	WMLK Bethel, Pennsylvania	9465 _{eu}		
0600-0700	KTBN Salt Lake City, Utah	7510 _{na}		
0600-0700	R. For Peace Int'l, Costa Rica	7375 _{na}	13630 _{na}	
0600-0700	Voice of America, Washington	6035 _{af}	6125 _{af}	9530 _{af}
		15350 _{af}	17715 _{af}	
0600-0700	Voice of Malaysia, Kuala Lumpur	6175 _{as}	9750 _{as}	15295 _{as}
0600-0700	Zimbabwe B'casting, Harare	3396 _{do}	7283 _{do}	
0615-0630 s	Radio Bertoua, Cameroon	4750 _{do}		
0618-0700 mtwhf	Radio Canada Int'l, Montreal	6050 _{eu}	6150 _{eu}	7155 _{eu}
		9740 _{eu}	9760 _{eu}	11840 _{eu}
		17840 _{eu}		
0625-0700	Voice of Kenya, Nairobi	7140 _{do}		
0630-0700 mtwhf	RTV Congolaise, Brazzaville	3265 _{do}	4765 _{do}	
0630-0700 mtwhf	Radio New Zealand Int'l	9700 _{pa}		
0630-0700	Radio Polonia, Warsaw	6135 _{eu}	7270 _{eu}	9675 _{eu}
		15120 _{eu}		
0600-0700	Radio Tirana, Albania	7205 _{eu}	9500 _{eu}	
0600-0700	Swiss Radio Int'l, Bern	15430 _{af}	17570 _{af}	21770 _{af}
0630-0700	Vatican Radio, Vatican City	11710 _{af}	17730 _{af}	21650 _{af}
0630-0700	Radio Australia, Melbourne	11880 _{va}	13705 _{va}	15240 _{va}
		15320 _{va}	17630 _{va}	17795 _{va}
		17855 _{va}	21525 _{va}	21775 _{va}
0630-0700	Voice of America, Washington	3980 _{va}	5995 _{va}	6060 _{va}
		6095 _{va}	6140 _{va}	7170 _{va}
		7325 _{va}	11805 _{va}	11825 _{va}
		15205 _{va}		
0645-0700	Ghana B'casting Corp., Accra	6130 _{af}		

SELECTED PROGRAMS**Sundays**

- 0600 Vatican Radio: The Pope, the Church, and the World. A look at the Pope's weekend message and a brief meditation.
- 0630 BBC: Jazz for the Asking. A jazz music request show.
- 0638 Swiss Radio Int'l: Feature. Programs broadcast on a rotating basis are "The Grapevine" (listener comment), "Supplement" (news analysis), and "Roundabout Switzerland" (travel/discovery).

Mondays

- 0600 Vatican Radio: A Many-Splendored Thing. A look at culture, history, spirituality, and the past (except March 25th: Letterbox, replies to listeners' questions with Veronica Scarlsbrick).
- 0630 BBC: Feature. See S 1401.
- 0638 Swiss Radio Int'l: Dateline. See S 0208.

Tuesdays

- 0600 Vatican Radio: Talking Point. A roundtable discussion on both religious and secular topics.
- 0630 BBC: On Stage. Live rock music performances staged for radio.
- 0638 Swiss Radio Int'l: Dateline. See S 0208.

Wednesdays

- 0600 Vatican Radio: Vatican Week. A look at the Pope's weekly general audience.
- 0630 BBC: Meridian. The world of the arts, including

A Vatican radio technician listens intently to Pope John Paul II.



- music, drama, and books.
- 0638 Swiss Radio Int'l: Dateline. See S 0208.

Thursdays

- 0600 Vatican Radio: Vatican Viewpoint. An examination of the ethical and moral issues of Catholicism.
- 0630 BBC: As We Forgive. See M 2315.
- 0638 Swiss Radio Int'l: Dateline. See S 0208.
- 0645 BBC: The Farming World. See H 0145.

Fridays

- 0600 Vatican Radio: The Church Today. The Catholic

perspective on contemporary issues.

- 0630 BBC: Meridian. See W 0630.
- 0638 Swiss Radio Int'l: Dateline. See S 0208.

Saturdays

- 0600 Vatican Radio: With Heart and Mind. See S 0050.
- 0630 BBC: Meridian. See W 0630.
- 0638 Swiss Radio Int'l: Dateline. See S 0208.
- 0648 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.

0700 UTC**[2:00 AM EST/11:00 PM PST]****FREQUENCIES**

0700-0710 w	Malawi B'casting, Blantyre	3381 ^{do}	5995 ^{do}	
0700-0710	Radio Bafoussam, Cameroon ¹	4000 ^{do}		
0700-0715	Radio Romania Int'l, Bucharest	11810 ^{au}	11940 ^{au}	15250 ^{au}
		15365 ^{au}	17720 ^{au}	17805 ^{au}
		21665 ^{au}		
0700-0710 mtwhf	Vatican Radio, Vatican City ^{ml}	6185 ^{eu}	6248 ^{eu}	9645 ^{eu}
		11740 ^{eu}		
0700-0730 s	Radio Riga Int'l, Latvia, USSR	5935 ^{eu}		
0700-0800	Ghana B'casting Corp., Accra	6130 ^{af}		
0700-0800	King of Hope, Lebanon	6280 ^{me}		
0700-0800	Radio 1, Accra, Ghana ¹	4915 ^{do}		
0700-0800 f	Radio 2, Accra, Ghana	3366 ^{do}		
0700-0800	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}	
0700-0800 sa	R. East Africa, Equatorial Guinea	9585 ^{af}		
0700-0800	Radio Havana Cuba	11835 ^{am}		
0700-0800	Radio Luxembourg	15350 ^{om}		
0700-0800	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na}	
0700-0800 mtwhf	Radio New Zealand Int'l	9700 ^{pa}		
0700-0800	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}	
0700-0800	Radio Pyongyang, North Korea	15340 ^{as}	17765 ^{as}	
0700-0800 sa	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as}	11905 ^{as}
0700-0800 smtwha	RTV Malaysia, Radio 4	7295 ^{do}		
0700-0800	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}	
0700-0800	KVOH Los Angeles, California	9785		
0700-0800	Radio Moscow World Service	15280 ^{va}	17600 ^{va}	17615 ^{va}
		17710 ^{va}	17790 ^{va}	17810 ^{na}

0700-0800	SLBS, Freetown, Sierra Leone	3316 ^{do}		
0700-0800	Voice of Free China, Taiwan	5950 ^{na}		
0700-0800	Voice of Kenya, Nairobi	7140 ^{do}		
0700-0800	Voice of Malaysia, Kuala Lumpur	6175 ^{as}	9750 ^{as}	15295 ^{as}
	BBC London, England			
0700-0800	Christian Science World Service	9455 ^{eu}	9840 ^{eu}	11705 ^{pa}
		13720 ^{as}		
0700-0800	WYFR Okeechobee, Florida	6065 ^{na}	7355 ^{eu}	9680 ^{eu}
		13695 ^{na}		
0700-0800	BBC London, England	5975 ^{na}	6195 ^{na}	7120 ^{af}
		7150 ^{af}	7230 ^{as}	9410 ^{eu}
		9640 ^{af}	12095 ^{eu}	15070 ^{me}
		15280 ^{as}	15590 ^{as}	17640 ^{as}
0700-0800	Radio Australia, Melbourne	11880 ^{va}	11930 ^{va}	15240 ^{va}
		15320 ^{va}	17630 ^{va}	17795 ^{va}
		17855 ^{va}	21525 ^{va}	21775 ^{va}
		7315 ^{eu}	9495 ^{sa}	
0700-0800	WHRI Noblesville, Indiana	7315 ^{eu}		
0700-0800	KTBN Salt Lake City, Utah	7510 ^{na}		
0700-0800	HCJB Quito, Ecuador	6205 ^{va}	9610 ^{va}	11840 ^{va}
0700-0800	Zimbabwe B'casting, Harare	3396 ^{do}	7283 ^{do}	
0705-0800 a	Radio Douala, Cameroon	4795 ^{do}		
0709-0800 mtwhf	Tristan Radio, Tirstan da Cunha	3290 ^{do}		
0730-0755	BRT, Brussels, Belgium	6035 ^{eu}	11695 ^{au}	13675 ^{eu}
0730-0800	Radio Netherlands, Hilversum	9630 ^{au}	15560 ^{au}	
0730-0800	Radio Sofia, Bulgaria	11765 ^{eu}	15160 ^{eu}	17825 ^{eu}
0730-0800	Swiss Radio Int'l, Bern	3985 ^{eu}	6165 ^{eu}	9535 ^{eu}
0740-0800	Radio Prague Inter-Program	6055 ^{eu}	7345 ^{eu}	9505 ^{eu}

0800 UTC**[3:00 AM EST/12:00 AM PST]****FREQUENCIES**

0800-0810 w	Malawi B'casting, Blantyre	3381 ^{do}		
0800-0810	Radio Bafoussam, Cameroon ¹	4000 ^{do}		
0800-0815 mtwhf	Tristan Radio, Tirstan da Cunha	3290 ^{do}		
0800-0825	Radio Netherlands, Hilversum	9630 ^{au}	15560 ^{au}	
0800-0825	Voice of Malaysia, Kuala Lumpur	6175 ^{as}	9750 ^{as}	15295 ^{as}
0800-0830	Voice of America, Washington	15195 ^{va}	21570 ^{va}	21700 ^{va}
0800-0830	Radio Tirana, Albania	9500 ^{as}	11835 ^{as}	
0800-0830	Voice of Amercia, Washington	11735 ^{va}	15160 ^{va}	15195 ^{va}
		21570 ^{va}		
0800-0830	Radio Australia, Melbourne	13705 ^{va}	15160 ^{va}	15240 ^{va}
		17630 ^{va}	17750 ^{va}	21525 ^{va}
		21775 ^{va}		
0800-0830	Voice of Islam, Bangladesh	15195 ^{as}	17815 ^{as}	
0800-0900	King of Hope, Lebanon	6280 ^{me}		
0800-0900	Radio 1, Accra, Ghana ¹	4915 ^{do}		
0800-0900 f	Radio 2, Accra, Ghana	3366 ^{do}		
0800-0900	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}	
0800-0900 a	Radio Douala, Cameroon	4795 ^{do}		
0800-0900 sa	R. East Africa, Equatorial Guinea	9585 ^{af}		
0800-0900	Radio Korea, Seoul, South Korea	7550 ^{eu}	13670 ^{eu}	
0800-0900	Radio Luxembourg	15350 ^{om}		
0800-0900 mtwhf	Radio New Zealand Int'l	9700 ^{pa}		
0800-0900	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}	
0800-0900	Radio Pyongyang, North Korea	15180 ^{as}	15230 ^{as}	
0800-0900 smtwha	RTV Malaysia, Radio 4	7295 ^{do}		

0800-0900	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}	
0800-0900	SLBS, Freetown, Sierra Leone	3316 ^{do}	5980 ^{do}	
0800-0900	BBC London, England	5975 ^{na}	6180 ^{na}	6190 ^{na}
		6190 ^{va}	7150 ^{va}	6190 ^{va}
0800-0900	Christian Science World Service	9455 ^{va}		
0800-0900	WYFR Okeechobee, Florida	5985 ^{na}		
0800-0900	WHRI Noblesville, Indiana	7315 ^{eu}	9495 ^{sa}	
0800-0900	VOA Europe, Washington	11735 ^{eu}	15160 ^{eu}	15195 ^{eu}
		21570 ^{eu}	21700 ^{eu}	
0800-0900	Voice of Indonesia, Jakarta	11752 ^{as}	11785 ^{as}	
0800-0900	Voice of Kenya, Nairobi	7140 ^{do}		
0800-0900	Voice of Nigeria, Lagos	7255 ^{af}		
0800-0900	Zimbabwe B'casting, Harare	3396 ^{do}	7283 ^{do}	
0830-0900	Radio Austria Int'l, Vienna	6155 ^{eu}	13730 ^{eu}	15450 ^{au}
		21490 ^{va}		
0830-0855	Radio Netherlands, Hilversum	15560 ^{au}		
0830-0900	Radio Netherlands, Hilversum	17575 ^{as}	21485 ^{as}	
0830-0900	Swiss Radio Int'l, Bern	9560 ^{as}	13685 ^{as}	17670 ^{as}
		21695 ^{as}		
0830-0900	Radio Australia, Melbourne	9580 ^{va}	13705 ^{va}	15240 ^{va}
		15160 ^{va}	17630 ^{va}	17715 ^{va}
		17750 ^{va}	21525 ^{va}	21775 ^{va}
0830-0900	Voice of Amercia, Washington	11735 ^{va}	15160 ^{va}	15195 ^{va}
		21570 ^{va}	21700 ^{va}	
0840-0850 mtwhfa	Voice of Greece, Athens	15650 ^{au}	17535 ^{au}	
0840-0900	Radio Prague Inter-Program	6055 ^{eu}	7345 ^{eu}	9505 ^{eu}

0900 UTC**[4:00 AM EST/1:00 AM PST]****FREQUENCIES**

0900-0905	Radio 1, Accra, Ghana ¹	4915 _{do}		
0900-0905 f	Radio 2, Accra, Ghana	3366 _{do}		
0900-0910	Malawi B'casting, Blantyre	5995 _{do}		
0900-0915	Radio Voice of Lebanon, Beirut	6549.5 _{me}		
0900-0925	Radio Netherlands, Hilversum	17575 _{as}	21485 _{as}	
0900-0930	Radio Australia, Melbourne	9580 _{na}	13705 _{va}	15160 _{va}
		15240 _{va}	17630 _{va}	17715 _{va}
		17750 _{va}	21775 _{va}	
0900-0950	Deutsche Welle, Köln, Germany	9565 _{af}	15410 _{af}	21600 _{af}
0900-0950	Deutsche Welle, Köln, Germany	6160 _{as}	11740 _{as}	11780 _{as}
		17820 _{as}	21465 _{as}	21540 _{as}
		21650 _{as}	21680 _{as}	
0900-1000 s	BBS, Thimphu, Bhutan	5023 _{do}		
0900-1000	FEBC Radio Int'l, Philippines	9800 _{as}	11845 _{as}	
0900-1000	King of Hope, Lebanon	6280 _{me}		
0900-1000	Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	
0900-1000	Radio Beijing, China	11755 _{au}	15440 _{au}	17710 _{au}
0900-1000 sa	R. East Africa, Equatorial Guinea	9585 _{af}		
0900-1000	Radio Japan, Tokyo	15270 _{pa}	17890 _{pa}	
0900-1000	Radio Luxembourg	15350 _{om}		
0900-1000	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
0900-1000	Radio Tanzania, Dar es Salaam	5985 _{af}	9685 _{af}	11765 _{af}
0900-1000	RTV Malaysia, Radio 4	7295 _{do}		

0900-1000	SBC Radio 1, Singapore	5052 _{do}	11940 _{do}	
0900-1000	SLBS, Freetown, Sierra Leone	3316 _{do}		
0900-1000	VOA Europe, Washington	11735 _{eu}	15160 _{eu}	15195 _{eu}
0900-1000	Voice of Kenya, Nairobi	7140 _{do}		
0900-1000	BBC London, England	5975 _{va}	6045 _{va}	6190 _{va}
		7180 _{va}	6195 _{va}	7180 _{va}
		11760 _{va}	12095 _{va}	
		15070 _{va}	21470 _{va}	21660 _{va}
0900-1000	Voice of Nigeria, Lagos	7255 _{af}		
0900-1000	Zimbabwe B'casting, Harare	3396 _{do}	7283 _{do}	
0905-1000	Cameroon Radio-TV, Yaounde	4850 _{do}		
0905-1000 sa	Radio 1, Accra, Ghana ¹	4915 _{do}		
0905-1000 sa	Radio 2, Accra, Ghana	3366 _{do}		
0905-1000 mtwhf	Radio 2 (Schools Program), Ghana	7295 _{do}		
0910-0940 smwha	Ulaanbaatar Radio, Mongolia	11850 _{pa}	12015 _{pa}	
0920-1000	BFBS (British Forces), London	15245 _{me}	17830 _{me}	21745 _{me}
0930-0940	RTV Togo, Lome	7265 _{do}		
0930-1000	Radio Australia, Melbourne	9580 _{na}	15240 _{va}	17630 _{va}
		17715 _{va}	17750 _{va}	21775 _{va}
		21825 _{va}		
0930-1000	Radio Afghanistan, Kabul	4940 _{as}	9635 _{as}	17655 _{as}
		21600 _{as}		
0940-1000	Radio Prague Inter-Program	6055 _{eu}	7345 _{eu}	9505 _{eu}

1000 UTC**[5:00 AM EST/2:00 AM PST]****FREQUENCIES**

1000-1025 mtwhf	BRT, Brussels, Belgium	6035 _{eu}	13675 _{eu}	21810 _{af}
1000-1030	Radio Tanzania, Dar es Salaam	5985 _{af}	9685 _{af}	11765 _{af}
1000-1030	Radio Australia, Melbourne	6080 _{va}	9580 _{na}	9760 _{va}
		15240 _{va}	17715 _{va}	21775 _{va}
1000-1030	Radio Afghanistan, Kabul	4940 _{as}	9635 _{as}	17655 _{as}
		21600 _{as}		
1000-1030	Voice of Vietnam, Hanoi	9840 _{as}	12020 _{as}	15010 _{as}
1000-1100	All India Radio, Delhi	15050 _{as}	15335 _{as}	17387 _{as}
		17865 _{as}	21735 _{as}	
1000-1100	Cameroon Radio-TV, Yaounde	4850 _{do}		
1000-1100 sa	Radio 1, Accra, Ghana ¹	4915 _{do}		
1000-1100 sa	Radio 2, Accra, Ghana	3366 _{do}		
1000-1100 mtwhf	Radio 2 (Schools Program), Ghana	7295 _{do}		
1000-1100	Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	
1000-1100	Radio Beijing, China	11755 _{au}	15440 _{au}	17710 _{au}
1000-1100 sa	R. East Africa, Equatorial Guinea	9585 _{af}		
1000-1100	Radio Luxembourg	15350 _{om}		
1000-1100	Radio Nigeria, Lagos	4990 _{do}	7285 _{do}	
1000-1100	BBC London, England	5975 _{eu}	7325 _{eu}	11750 _{sa}
		11940 _a	15070 _{eu}	15310 _{as}
		17640 _{af}	21470 _{af}	21660 _{af}
1000-1100	RTV Malaysia, Radio 4	7295 _{do}		
1000-1100	SBC Radio 1, Singapore	5010 _{do}	5052 _{do}	11940 _{do}
1000-1100	SLBS, Freetown, Sierra Leone	3316 _{do}		

1000-1100 s	Tristan Radio, Tirstan da Cunha	3290 _{do}		
1000-1100	Voice of America, Washington	5985 _{as}	11720 _{as}	11735 _{va}
		15160 _{va}	15225 _{va}	15425 _{as}
		21570 _{va}	21705 _{va}	
1000-1100	Voice of America, Washington	6075 _{ca}	9590 _{ca}	11915 _{ca}
1000-1100	Voice of Kenya, Nairobi	7140 _{do}		
1000-1100	Voice of Nigeria, Lagos	7255 _{af}		
1000-1100	Zimbabwe B'casting, Harare	3396 _{do}	7283 _{do}	
1000-1015 mtwhf	Radio Budapest, Hungary	6110 _{as}	9585 _{as}	9835 _{as}
		11925 _{as}	15160 _{as}	15220 _{as}
1030-1040 mtwhf	Malawi B'casting, Blantyre	5995 _{do}		
1030-1045 mtwhf	Radio Budapest, Hungary	6110 _{as}	9585 _{as}	9835 _{as}
		11925 _{as}	15160 _{as}	15220 _{as}
1030-1100	Radio Australia, Melbourne	6080 _{va}	9580 _{na}	9760 _{va}
		11715 _{va}	21775 _{va}	
1030-1100	Radio Korea, Seoul, S.Korea	11715 _{na}		
1030-1100	Radio Netherlands, Hilversum	6020 _{am}	11890 _{am}	
1030-1100 sa	Radio Tanzania, Dar es Salaam	5985 _{af}	9685 _{af}	11765 _{af}
1030-1100	Sri Lanka B'casting Corp.	11835 _{as}	15120 _{as}	17850 _{as}
1030-1100	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}
1030-1100	UAE Radio, Dubai,	15435 _{eu}	21605 _{eu}	
	United Arab Emirates			
1040-1050 mtwhfa	Voice of Greece, Athens	15650 _{as}	17535 _{as}	
1040-1100	Radio Prague Inter-Program	6055 _{eu}	7345 _{eu}	9505 _{eu}
1045-1100 s	Radio Budapest, Hungary	7220 _{eu}	9585 _{eu}	9835 _{eu}
		11910 _{eu}	15160 _{eu}	15220 _{eu}

GET THE LATEST ADVANCES IN ELECTRONICS

WITH A SUBSCRIPTION TO

Radio- Electronics



ENJOY THE WORLD OF ELECTRONICS EACH MONTH!

Now you can subscribe to the best electronics magazine. The only one that brings you articles on—electronics projects, technology, circuit design, communications, new products and much more.

Radio-Electronics looks to the future and shows you what new video, audio and computer products are on the horizon. What's more you'll find helpful, monthly departments such as Video News, Equipment Reports, Hardware Hacker, Audio Update, Drawing Board, Communications Corner. All designed to give you instruction, tips, and fun.

Radio-Electronics gives you exciting articles like:

- ☐ ISDN: The Telephone Network of Tomorrow
- ☐ The Facts on FAX
- ☐ A Digital Phone Lock
- ☐ How To Design Switching Circuits

PLUS: COMPUTER DIGEST! A New Kind of Magazine for Electronics Professionals.

- ☐ EIA-232 A real standard for serial interfacing?
- ☐ Build a synergy card for your PC
- ☐ '386 Power at a '286 price
- ☐ Build a biofeedback monitor
- ☐ More on Multiplexing



FOR FASTER SERVICE CALL TODAY
1-800-999-7139

DON'T DELAY SUBSCRIBE TODAY!

Radio-Electronics 7MT02

1100 UTC**[6:00 AM EST/3:00 AM PST]****FREQUENCIES**

1100-1130	Radio Mozambique, Maputo	9525 _{af}	11818 _{af}	11835 _{af}
1100-1130	Sri Lanka B'casting Corp.	11835 _{as}	15120 _{as}	17850 _{as}
1100-1130	Swiss Radio Int'l, Bern	13635 _{as}	15570 _{as}	17830 _{as}
		21770 _{as}		
1100-1130	Voice of Vietnam, Hanoi	7416 _{as}	9732 _{as}	
1100-1150	Deutsche Welle, Köln, Germany	11890 _{af}	15410 _{af}	17765 _{af}
		17800 _{af}	21600 _{af}	
1100-1200	Radio Australia, Melbourne	6080 _{va}	7240 _{va}	9580 _{na}
		9710 _{va}	9760 _{va}	11930 _{va}
		15160 _{va}	17715 _{va}	21775 _{va}
		21825 _{va}		
1100-1200	Radio 1, Accra, Ghana ¹	4915 _{do}		
1100-1200 sa	Radio 2, Accra, Ghana	3366 _{do}		
1100-1200	Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	
1100-1200 mtwhf	Radio Douala, Cameroon	4795 _{do}		
1100-1200	BBC London, England	5975 _{va}	7325 _{va}	9410 _{va}
		9750 _{va}	11940 _{va}	15590 _{va}
		17640 _{va}	17790 _{va}	21660 _{va}
1100-1200 sa	R. East Africa, Equatorial Guinea	9585 _{af}		
1100-1200	R. Korea, Seoul, South Korea	15575 _{af}		
1100-1200	Radio Luxembourg	15350 _{om}		
1100-1200	Radio Nigeria, Lagos	4990 _{do}	7285 _{do}	
1100-1200	Radio Pyongyang, North Korea	6576 _{na}	9977 _{na}	11335 _{na}
1100-1200	Radio RSA, South Africa	9555 _{af}	11805 _{af}	11900 _{af}
		17835 _{af}		
1100-1200 sa	Radio Tanzania, Dar es Salaam	5985 _{af}	9685 _{af}	11765 _{af}
1100-1200	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}
1100-1200	RTV Malaysia, Radio 4	7295 _{do}		
1100-1200	SBC Radio 1, Singapore	5010 _{do}	5052 _{do}	11940 _{do}
1100-1200	SLBS, Freetown, Sierra Leone	3316 _{do}		

1100-1200 s	Tristan Radio, Tirstan da Cunha	3290 _{do}		
1100-1200	Voice of America, Washington	5985 _{as}	6110 _{as}	9760 _{as}
		11720 _{as}	15155 _{as}	15425 _{as}
		6075 _{ca}	9590 _{ca}	11915 _{ca}
1100-1200	Voice of America, Washington	7445 _{as}		
1100-1200	Voice of Asia, Kaohsiung, Taiwan	7445 _{as}		
1100-1200	Voice of Kenya, Nairobi	7140 _{do}		
1100-1200	Voice of Nigeria, Lagos	7255 _{af}		
1100-1200 war	Voice of Peace, Baghdad, Iraq	11860 _{me}	21675 _{me}	
1100-1200	Zimbabwe B'casting, Harare	3396 _{do}	7283 _{do}	
1110-1115 mtwhf	Radio Botswana, Gaborone	5955 _{af}	7255 _{af}	
1115-1145	Voice of Radio Nepal, Kathmandu	5005 _{as}	7165 _{as}	
1125-1130 sa	Radio Botswana, Gaborone	5955 _{af}	7255 _{af}	
1130-1140	Radio Lesotho, Maseru	4800 _{do}		
1130-1145 mtwhf	Vatican Radio, Vatican City ^{ml}	6248 _{eu}	9645 _{eu}	11740 _{eu}
		15210 _{eu}		
1130-1145 a	Radio Budapest, Hungary	7220 _{eu}	9585 _{eu}	9835 _{eu}
		11910 _{eu}	15160 _{eu}	15220 _{eu}
1130-1145	RTV Malaysia-Sarawak, Red Network	5950 _{do}	7160 _{do}	
1130-1200	Radio Austria Int'l, Vienna	6155 _{eu}	13730 _{eu}	15430 _{as}
		15450 _{eu}	21490 _{na}	
1130-1200	Radio Netherlands, Hilversum	5955 _{eu}	9715 _{eu}	17575 _{eu}
		21480 _{eu}	21520 _{eu}	
1130-1200	Radio Thailand, Bangkok	4830 _{as}	9655 _{as}	11905 _{as}
1130-1200	Radio Tirana, Albania	9480 _{as}	11835 _{as}	
1130-1200	Voice of America, Washington	11735 _{me}	15160 _{me}	15225 _{me}
		21550 _{me}	21705 _{me}	
1130-1200	Voice of the Islamic Republic of Iran, Tehran	9525 _{va}	9685 _{va}	9705 _{va}
		11745 _{va}	11790 _{va}	
1140-1200	Radio Prague Inter-Program	6055 _{eu}	7345 _{eu}	9505 _{eu}
1145-1200	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 _{af}		

SELECTED PROGRAMS**Sundays**

- 1108 Swiss Radio Int'l: Feature. See S 0638.
 1110 Kol Israel: You're On The Air. A listener feedback program.
 1115 BBC: Short Story. Brief tales written by BBC listeners (except March 3rd: Seeing Stars, a monthly look at astronomy).
 1115 Radio Beijing: China Anthology. Episodes from China's past, with profiles of historical figures.
 1125 Radio Beijing: Music Album. A combination of traditional and Western musical selections.
 1130 BBC: The Ken Bruce Show. See S 0030.
 1130 Radio Austria Int'l: Austrian Shortwave Panorama. Developments in communications and shortwave radio news.
 1130 Radio Netherlands: Happy Station. Tom Meyer's family entertainment program with music and letters.
 1140 Radio Beijing: Listeners' Letterbox. Listener letters and information about China.

Mondays

- 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1110 Kol Israel: Israel Mosaic. A weekly magazine on life in Israel.
 1115 BBC: Health Matters. New developments in the world of medical science and fitness.
 1115 Radio Beijing: Current Affairs. An in-depth look at events and happenings in China.
 1130 BBC: Composer of the Month. See M 0230.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1137 Radio Netherlands: Newline. See S 0037.
 1140 Radio Beijing: Learn to Speak Chinese. Chinese language lessons for English speakers.
 1152 Radio Netherlands: The Research File. The latest developments in science and technology.

Tuesdays

- 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1110 Kol Israel: Talking Point. A program of discussion on topical issues.
 1115 BBC: Waveguide. See M 0530.
 1115 Radio Beijing: Current Affairs. See M 1115.
 1125 BBC: Book Choice. See S 0225.
 1130 BBC: Megamix. See T 0030.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1137 Radio Netherlands: Newline. See S 0037.
 1152 Radio Netherlands: Images. An arts magazine, featuring film, theatre, opera, books, and music.

Wednesdays

- 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1110 Kol Israel: This Land. Jackie Beecham presents a travel magazine.
 1115 BBC: Country Style. See W 0145.
 1115 Radio Beijing: Current Affairs. See M 1115.
 1130 BBC: Meridian. See W 0630.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1137 Radio Netherlands: Newline. See S 0037.
 1140 Radio Beijing: Learn to Speak Chinese. See M 1140.
 1152 Radio Netherlands: Feature. Topical programming on various subjects.

Thursdays

- 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1110 Kol Israel: Studio Three. A look at the arts, music, and culture in Israel.
 1115 BBC: The Farming World. See H 0145.
 1115 Radio Beijing: Current Affairs. See M 1115.
 1130 BBC: Drama. A serialization or dramatization by the BBC's crack theatre team.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1137 Radio Netherlands: Newline. See S 0037.
 1140 Radio Beijing: Culture in China. The rich cultural

heritage of China, as manifested in literature and art.

- 1152 Radio Netherlands: Media Network. Jonathan Marks surveys communications developments worldwide.

Fridays

- 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1110 Kol Israel: Thank Goodness It's Friday. A look at Judaism today.
 1115 BBC: Global Concerns. See F 0145.
 1115 Radio Beijing: Current Affairs or The Business Show. An in-depth look at events and happenings in China, or news on Chinese trade and industry.
 1130 BBC: Meridian. See W 0630.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1137 Radio Netherlands: Asian. A live magazine show with interviews with newsmakers, press reviews, monthly quizzes and listener opinion.
 1140 Radio Beijing: In the Third World. Reports and music from developing nations.

Saturdays

- 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1110 Kol Israel: Spotlight. See S 0010.
 1115 BBC: Worldbrief. See F 2315.
 1115 Radio Beijing: Press Clippings. See S 0015.
 1118 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.
 1120 Radio Beijing: Travel Talk. See S 0020.
 1128 Radio Beijing: Cooking Show. See S 0028.
 1130 BBC: Meridian. See W 0630.
 1130 Radio Austria Int'l: Austrian Coffee-table. A look at the arts, especially music.
 1135 Radio Beijing: Music from China. See S 0035.
 1137 Radio Netherlands: Newline. See S 0037.
 1152 Radio Netherlands: Over to You. See S 0052.

1200 UTC**[7:00 AM EST/4:00 AM PST]****FREQUENCIES**

1200-1210 w	Malawi B'casting, Blantyre	3381 ^{do}	5995 ^{do}
1200-1215	Voice of the People of Cambodia, Phnom-Penh	9695 ^{as}	11938 ^{as}
1200-1225 sa	Radio 2, Accra, Ghana	3366 ^{do}	
1200-1225	Radio Netherlands, Hilversum	5955 ^{eu}	9715 ^{eu} 17575 ^{eu}
		21480 ^{eu}	21520 ^{eu}
1200-1225	Voice of the Islamic Republic of Iran, Tehran	9525 ^{va}	9685 ^{va} 9705 ^{va}
		11745 ^{va}	11790 ^{va}
1200-1230	Radio Mogadishu, Somalia	6095 ^{af}	
1200-1230	Radio Romania Int'l, Bucharest	15365 ^{as}	15380 ^{as} 17720 ^{as}
1200-1230	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as} 11905 ^{as}
1200-1230 s	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af} 17895 ^{af}
1200-1230 smwha	Ulaanbaatar Radio, Mongolia	11850 ^{as}	12015 ^{as}
1200-1230 mtwhf	Vatican Radio, Vatican City	17865 ^{as}	21515 ^{as}
1200-1230	Voice of America, Washington	6110 ^{as}	9760 ^{as} 11715 ^{as}
		15155 ^{as}	15425 ^{as}
1200-1300	Radio 1, Accra, Ghana ¹	4915 ^{do}	
1200-1300	Radio Beijing, China	15110 ^{am}	17715 ^{am}
1200-1300	Radio Beijing, China	8425 ^{as}	11660 ^{as}
1200-1300 mtwhf	Radio Douala, Cameroon	4795 ^{do}	
1200-1300 sa	Radio East Africa, Equatorial Guinea	9585 ^{af}	
1200-1300	Radio Jordan, Amman	13655 ^{??}	
1200-1300	Radio Luxembourg	15350 ^{om}	
1200-1300	Radio Nigeria, Lagos	4990 ^{do}	7285 ^{do}

1200-1300 sa	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af}	11765 ^{af}
1200-1300	BBC London, England	5975 ^{va}	7325 ^{va}	9410 ^{va}
		12095 ^{va}	15070 ^{va}	
1200-1300	RTV Malaysia, Radio 4	7295 ^{do}		
1200-1300	SBC Radio 1, Singapore	5010 ^{do}	5052 ^{do}	11940 ^{do}
1200-1300	SLBS, Freetown, Sierra Leone	3316 ^{do}	5980 ^{do}	
1200-1300	Voice of Kenya, Nairobi	7140 ^{do}		
1200-1300	Voice of Nigeria, Lagos	7255 ^{af}		
1200-1300 war	Voice of Peace, Baghdad, Iraq	11860 ^{me}	21675 ^{me}	
1215-1230	Radio Bayrak, Cyprus	6150 ^{va}		
1215-1300	Radio Cairo, Egypt	17595 ^{as}		
1215-1300	R. Korea, Seoul, South Korea	9750 ^{na}		
1226-1300	Radio 2, Accra, Ghana	7295 ^{do}		
1230-1255 s	BRT, Brussels, Belgium	21810 ^{na}		
1230-1300	Radio Bangladesh, Dhaka	15195 ^{as}	17815 ^{as}	
1230-1300	Radio Sweden, Stockholm	11715 ^{as}	17740 ^{as}	21570 ^{as}
1230-1300	Sri Lanka B'casting Corp.	6075 ^{as}	9720 ^{as}	
1230-1300 mtwhf	Tristan Radio, Tristan da Cunha	3290 ^{do}		
1230-1300	Voice of America, Washington	6110 ^{as}	9760 ^{as}	11715 ^{as}
		11735 ^{va}	15155 ^{as}	15225 ^{va}
		15400 ^{as}	15425 ^{as}	21550 ^{va}
		21700 ^{va}		
1230-1300	Voice of Vietnam, Hanoi	9840 ^{as}	12020 ^{as}	15010 ^{as}
1235-1245	Voice of Greece, Athens	15625 ^{am}	15650 ^{am}	17535 ^{am}
1240-1300	Radio Prague Inter-Program	6055 ^{eu}	7345 ^{eu}	9505 ^{eu}

SELECTED PROGRAMS**Sundays**

1200 Radio Norway Int'l: Norway Today. See S 0100.
 1201 BBC: Play of the Week. See S 0101.
 1215 Radio Beijing: China Anthology. See S 1115.
 1225 Radio Beijing: Music Album. See S 1125.
 1240 Radio Beijing: Listeners' Letterbox. See S 1140.

Mondays

1200 Vatican Radio: A Many-Splendored Thing (except March 25th: Letterbox). See M 0600.
 1215 BBC: Ned Sherrin's Counterpoint. The wide-ranging musical game show.
 1215 Radio Beijing: Current Affairs. See M 1115.
 1240 Radio Beijing: Learn to Speak Chinese. See M 1140.
 1245 BBC: Sports Roundup. See S 1345.

Tuesdays

1200 Vatican Radio: Talking Point. See T 0600.
 1215 BBC: Multitrack 1: Top 20. See M 2330.
 1215 Radio Beijing: Current Affairs. See M 1115.
 1240 Radio Beijing: Listeners' Letterbox. See S 1140.
 1240 Radio Beijing: Listeners' Letterbox. See S 1140.
 1245 BBC: Sports Roundup. See S 1345.

Wednesdays

1200 Vatican Radio: Vatican Week. See W 0600.
 1215 BBC: New Ideas. See M 1615.
 1215 Radio Beijing: Current Affairs. See M 1115.
 1235 BBC: Give Us Our Daily Bread. See M 1635.
 1240 Radio Beijing: Learn to Speak Chinese. See M 1140.
 1245 BBC: Sports Roundup. See S 1345.

Thursdays

1200 Vatican Radio: Vatican Viewpoint. See H 0600.
 1215 BBC: Multitrack 2. See W 2330.
 1215 Radio Beijing: Current Affairs. See M 1115.
 1240 Radio Beijing: Culture in China. See H 1140.



Reading letters from listeners to the VOA's Farsi service are Nader Afshar, Ahmad Baharloo, and Bill Royce.

1245 BBC: Sports Roundup. See S 1345.

Fridays

1200 Vatican Radio: The Church Today. See F 0600.
 1215 BBC: The Reith Lectures. Jonathan Sacks, chief rabbi of the UK, gives the annual series of BBC lectures (except March 28th: Feature, topical programming on various subjects).
 1215 Radio Beijing: Current Affairs or The Business Show. See F 1115.
 1240 Radio Beijing: In the Third World. See F 1140.
 1245 BBC: Sports Roundup. See S 1345.

Saturdays

1200 Radio Norway Int'l: Norway Today. See S 0100.
 1215 BBC: Multitrack 3. See F 2330.
 1215 Radio Beijing: Press Clippings. See S 0015.
 1220 Radio Beijing: Travel Talk. See S 0020.
 1228 Radio Beijing: Cooking Show. See S 0028.
 1235 Radio Beijing: Music from China. See S 0035.
 1245 BBC: Sports Roundup. See S 1345.

1300 UTC**[8:00 AM EST/5:00 AM PST]****FREQUENCIES**

1300-1315	R. Korea, Seoul, South Korea	9750 _{na}	
1300-1325	Voice of Kenya, Nairobi	7140 _{do}	
1300-1330	Radio Cairo, Egypt	17595 _{as}	
1300-1330	Radio Beijing, China	11600 _{as}	11660 _{as}
1300-1330 mtwhf	Radio Douala, Cameroon	4795 _{do}	
1300-1330	Voice of America, Washington	6110 _{as}	9760 _{as} 11715 _{as}
		15155 _{as}	15245 _{as}
1300-1400	FEBC Radio Int'l, Philippines	11850 _{as}	
1300-1400	Radio 1, Accra, Ghana ¹	4915 _{do}	
1300-1400	Radio 2, Accra, Ghana	7295 _{do}	
1300-1400 sa	R. East Africa, Equatorial Guinea	9585 _{af}	
1300-1400	Radio Jordan, Amman	13655 _{??}	
1300-1400	Radio Luxembourg	15350 _{om}	
1300-1400	Radio Nigeria, Lagos	4990 _{do}	7285 _{do}
1300-1400	Radio Pyongyang, North Korea	9325 _{eu}	9345 _{eu} 9640 _{as}
		13650 _{as}	15230 _{as}
1300-1400	Radio Romania Int'l, Bucharest	11940 _{eu}	15365 _{eu} 17720 _{eu}
		21665 _{eu}	
1300-1400 sa	Radio Tanzania, Dar es Salaam	5985 _{af}	9684 _{af} 11765 _{af}
1300-1400	BBC London, England	5975 _{va}	7325 _{va} 9410 _{va}
		12095 _{va}	15070 _{va}
1300-1400	RTV Malaysia, Radio 4	7295 _{do}	

1300-1400	SBC Radio 1, Singapore	5010 _{do}	5052 _{do} 11940 _{do}
1300-1400	SLBS, Freetown, Sierra Leone	3316 _{do}	5980 _{do}
1300-1400	Sri Lanka B'casting Corp.	6075 _{as}	9720 _{as}
1300-1400	Voice of Nigeria, Lagos	7255 _{af}	
1300-1400 war	Voice of Peace, Baghdad, Iraq	11860 _{me}	21675 _{me}
1300-1330	Swiss Radio Int'l, Bern	6165 _{eu}	9535 _{eu} 12030 _{eu}
1315-1330	Radio Voice of Lebanon, Beirut	6549.5 _{me}	
1325-1400 mtwhf	Voice of Kenya, Nairobi	4934 _{do}	
1330-1400	All India Radio, Delhi	9565 _{as}	11760 _{as} 15335 _{as}
1330-1400	BFBS (British Forces), London	15390 _{me}	17695 _{me} 21735 _{me}
1330-1400	Nat'l Radio of Laos, Vientiane	7112 _{as}	
1330-1400	Radio Austria Int'l, Vienna	6155 _{eu}	13730 _{eu} 15430 _{as}
		21490 _{va}	
1330-1400	Radio Douala, Cameroon	4795 _{do}	
1330-1400 a	Radio Republik Indonesia Jayapura	3385 _{do}	6070 _{do}
1330-1400	Swiss Radio Int'l, Bern	7480 _{as}	11695 _{as} 13635 _{as}
		15570 _{as}	17830 _{as} 21695 _{as}
1330-1400	UAE Radio, Dubai, United Arab Emirates	15435 _{eu}	21605 _{eu}
1330-1400	Voice of America, Washington	6110 _{as}	9760 _{as} 11905 _{va}
		15155 _{as}	15225 _{va} 15400 _{va}
		15425 _{as}	21550 _{va} 21700 _{va}
1330-1400	Voice of Turkey, Ankara	17785 _{as}	
1330-1400	Voice of Vietnam, Hanoi	9840 _{as}	12020 _{as} 15010 _{as}

SELECTED PROGRAMS**Sundays**

1300 Radio Norway Int'l: Norway Today. See S 0100.
 1308 Swiss Radio Int'l: Feature. See S 0638.
 1315 Radio Beijing: China Anthology. See S 1115.
 1325 Radio Beijing: Music Album. See S 1125.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Feature. See S 0638.
 1340 Radio Beijing: Listeners' Letterbox. See S 1140.
 1345 BBC: Sports Roundup. The day's sports news.

Mondays

1308 Swiss Radio Int'l: Dateline. See S 0208.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1315 Radio Beijing: Current Affairs. See M 1115.
 1330 BBC: Andy Kershaw's World of Music. See M 0215.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1340 Radio Beijing: Learn to Speak Chinese. See M 1140.
 1345 BBC: Personal View. See S 0445.

Tuesdays

1308 Swiss Radio Int'l: Dateline. See S 0208.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1315 Radio Beijing: Current Affairs. See M 1115.
 1330 BBC: Network UK. See T 0215.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1340 Radio Beijing: Listeners' Letterbox. See S 1140.
 1345 BBC: A Taste of Soul. See S 0430.

Wednesdays

1308 Swiss Radio Int'l: Dateline. See S 0208.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1315 Radio Beijing: Current Affairs. See M 1115.
 1330 BBC: Development '91. Aid and development issues.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1340 Radio Beijing: Learn to Speak Chinese. See M 1140.

Thursdays

1308 Swiss Radio Int'l: Dateline. See S 0208.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1315 Radio Beijing: Current Affairs. See M 1115.
 1330 BBC: Network UK. See T 0215.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1340 Radio Beijing: Culture in China. See H 1140.
 1345 BBC: Jazz Now and Then or Folk in Britain. A look at jazz or folk music on the British Isles.

Fridays

1308 Swiss Radio Int'l: Dateline. See S 0208.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1315 Radio Beijing: Current Affairs or The Business Show. See F 1115.
 1330 BBC: Quiz. Test your wits in a game show of the airwaves.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1340 Radio Beijing: In the Third World. See F 1140.

Saturdays

1300 Radio Norway Int'l: Norway Today. See S 0100.
 1308 Swiss Radio Int'l: Dateline. See S 0208.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1315 Radio Beijing: Press Clippings. See S 0015.
 1318 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.
 1320 Radio Beijing: Travel Talk. See S 0020.
 1328 Radio Beijing: Cooking Show. See S 0028.
 1330 BBC: Network UK. See T 0215.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1335 Radio Beijing: Music from China. See S 0035.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1345 BBC: Good Books. See M 0315.
 1348 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.

*Idele Ross interviews
 new Soviet
 immigrants for Kol
 Israel's Wednesday
 program, "Living
 Here."*



1400 UTC**[9:00 AM EST/6:00 AM PST]****FREQUENCIES**

1400-1410	Malawi B'casting, Blantyre	3381 ^{do}	1400-1500	RTV Malaysia, Radio 4	7295 ^{do}
1400-1410	Radio Juba, Sudan	9540 ^{do}	1400-1500	SBC Radio 1, Singapore	5010 ^{do}
1400-1415	Radio Jordan, Amman	13655 ^{??}	1400-1500	SLBS, Freetown, Sierra Leone	3316 ^{do}
1400-1425 mtwhf	BRT, Brussels, Belgium	21810 ^{na}	1400-1500	Sri Lanka B'casting Corp.	6075 ^{as}
1400-1430	Radio Douala, Cameroon	4795 ^{do}	1400-1500	Voice of America, Washington	6110 ^{as}
1400-1430	Radio Sweden, Stockholm	9765 ^{as}			7125 ^{as}
1400-1430	Radio Tirana, Albania	9500 ^{as}			9645 ^{as}
1400-1500	All India Radio, Delhi	9565 ^{as}			9760 ^{as}
1400-1500	Cameroon Radio-TV, Yaounde	4850 ^{na}			11905 ^{va}
1400-1500	FEBC Radio Int'l, Philippines	11850 ^{as}			15205 ^{as}
1400-1500	King of Hope, Lebanon	6280 ^{me}			15300 ^{va}
1400-1500	Radio 1, Accra, Ghana ¹	4915 ^{do}			15395 ^{as}
1400-1500	Radio 2, Accra, Ghana	7295 ^{do}			15425 ^{as}
1400-1500	Radio Beijing, China	7405 ^{am}			17885 ^{va}
1400-1500	Radio Beijing, China	4200 ^{as}			21540 ^{va}
		11815 ^{as}			21700 ^{va}
		15165 ^{as}			4934 ^{do}
1400-1500	BBC London, England	12095 ^{va}	1400-1500 mtwhf	Voice of Kenya, Nairobi	7255 ^{af}
1400-1500	R. Korea, Seoul, South Korea	9570 ^{va}	1415-1500	Voice of Nigeria, Lagos	5023 ^{do}
1400-1500	Radio Luxembourg	15350 ^{om}	1420-1500	BBS, Thimphu, Bhutan	9560 ^{??}
1400-1500	Radio Nigeria, Lagos	4990 ^{do}	1430-1500	Radio Jordan, Amman	6155 ^{eu}
1400-1500 sa	Radio Tanzania, Dar es Salaam	5985 ^{af}	1430-1500 mtwhfa	Radio Austria Int'l, Vienna	13730 ^{eu}
		9684 ^{af}	1430-1500	Douala, Cameroon	21490 ^{va}
		11765 ^{af}	1430-1500	Radio Netherlands, Hilversum	4795 ^{do}
					5955 ^{eu}
					9715 ^{eu}
					17575 ^{eu}
					21480 ^{eu}
					21520 ^{eu}
					3970 ^{do}
					7105 ^{do}
			1435-1450	Nei Mongol People's B'casting Station, Hohot, China	
			1445-1500 smwha	Ulaanbaatar Radio, Mongolia	9575 ^{as}
			1445-1500	Vatican Radio, Vatican City	13780 ^{as}
					6248 ^{eu}
					9645 ^{eu}
					11740 ^{eu}

SELECTED PROGRAMS**Sundays**

- 1401 BBC: Feature. Topical programming on various subjects.
- 1415 Radio Beijing: China Anthology. See S 1115.
- 1425 Radio Beijing: Music Album. See S 1125.
- 1430 BBC: Anything Goes. Bob Holness presents a variety of odd recordings.
- 1430 Radio Austria Int'l: Austrian Shortwave Panorama. See S 1130.
- 1430 Radio Netherlands: Happy Station. See S 1130.
- 1440 Radio Beijing: Listeners' Letterbox. See S 1140.

Monday

- 1405 BBC: Outlook. Conversation, controversy, and color from Britain and the rest of the world.
- 1415 Radio Beijing: Current Affairs. See M 1115.
- 1430 BBC: Off the Shelf. See M 0430.
- 1430 Radio Austria Int'l: Report from Austria. See S 0130.
- 1437 Radio Netherlands: Newline. See S 0037.
- 1440 Radio Beijing: Learn to Speak Chinese. See M 1140.
- 1445 BBC: They Made Our World. See S 0215.
- 1452 Radio Netherlands: The Research File. See M 1152.
- 1455 BBC: Book Choice. See S 0225.

Tuesdays

- 1405 BBC: Outlook. See M 1405.
- 1415 Radio Beijing: Current Affairs. See M 1115.
- 1430 BBC: Off the Shelf. See M 0430.
- 1430 Radio Austria Int'l: Report from Austria. See S 0130.
- 1437 Radio Netherlands: Newline. See S 0037.
- 1440 Radio Beijing: Listeners' Letterbox. See S 1140.
- 1445 BBC: On The Record. See M 0145.
- 1452 Radio Netherlands: Images. See T 1152.

Wednesdays

- 1405 BBC: Outlook. See M 1405.
- 1415 Radio Beijing: Current Affairs. See M 1115.
- 1430 BBC: Off the Shelf. See M 0430.
- 1430 Radio Austria Int'l: Report from Austria. See S 0130.
- 1437 Radio Netherlands: Newline. See S 0037.

- 1440 Radio Beijing: Learn to Speak Chinese. See M 1140.
- 1445 BBC: Business Matters. A weekly survey of commercial and financial news.
- 1452 Radio Netherlands: Feature. See W 1152.

Thursdays

- 1405 BBC: Outlook. See M 1405.
- 1415 Radio Beijing: Current Affairs. See M 1115.
- 1430 BBC: Off the Shelf. See M 0430.
- 1430 Radio Austria Int'l: Report from Austria. See S 0130.
- 1437 Radio Netherlands: Newline. See S 0037.
- 1440 Radio Beijing: Culture in China. See H 1140.
- 1445 BBC: Recording of the Week. See M 0545.
- 1452 Radio Netherlands: Media Network. See H 1152.

Fridays

- 1405 BBC: Outlook. See M 1405.
- 1415 Radio Beijing: Current Affairs or The Business Show. See F 1115.
- 1430 BBC: Off the Shelf. See M 0430.
- 1430 Radio Austria Int'l: Report from Austria. See S 0130.

There are many steps to producing a radio program, as Vatican Radio's Sean-Patrick Lovett illustrates here.

- 1437 Radio Netherlands: Asiascan. See F 1137.
- 1440 Radio Beijing: In the Third World. See F 1140.
- 1445 BBC: Talk (except March 1st, 8th: Backing the Canvas). See M 0445.

Saturdays

- 1401 BBC: John Peel. See T 0030.
- 1415 Radio Beijing: Press Clippings. See S 0015.
- 1420 Radio Beijing: Travel Talk. See S 0020.
- 1428 Radio Beijing: Cooking Show. See S 0028.
- 1430 BBC: Sportsworld. The weekly sports magazine.
- 1430 Radio Austria Int'l: Austrian Coffeetable. See A 1130.
- 1435 Radio Beijing: Music from China. See S 0035.
- 1437 Radio Netherlands: Newline. See S 0037.
- 1452 Radio Netherlands: Over to You. See S 0052.



1500 UTC**[10:00 AM EST/7:00 AM PST]****FREQUENCIES**

1500-1515	smwha Ulaanbaatar Radio, Mongolia	9575 ^{as}	13780 ^{as}	
1500-1525	Radio Netherlands, Hilversum	5955 ^{eu}	9715 ^{eu}	17575 ^{eu}
		21480 ^{eu}	21520 ^{eu}	
1500-1530	Radio Romania Int'l, Bucharest	11775 ^{as}	11940 ^{as}	15250 ^{as}
		15335 ^{as}	17720 ^{as}	17745 ^{as}
1500-1530 sa	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af}	11765 ^{af}
1500-1530	Voice of America, Washington	6110 ^{as}	7125 ^{as}	9645 ^{as}
		9700 ^{va}	15205 ^{va}	15395 ^{as}
1500-1550	Deutsche Welle, Koln, Germany	9735 ^{af}	9760 ^{af}	11965 ^{af}
		13610 ^{af}	17765 ^{af}	21600 ^{af}
1500-1600	Cameroon Radio-TV, Yaounde	4850 ^{do}		
1500-1600	FEBC Radio Int'l, Philippines	11850 ^{as}		
1500-1600	FEBA, Mahe, Seychelles	9590 ^{as}	11865 ^{as}	15330 ^{as}
1500-1600	Radio 1, Accra, Ghana ¹	4915 ^{do}		
1500-1600	Radio 2, Accra, Ghana	7295 ^{do}		
1500-1600	Radio Beijing, China	7405 ^{am}		
1500-1600	BBC London, England	5975 ^{va}	7325 ^{va}	9410 ^{va}
		12095 ^{va}	15070 ^{va}	
1500-1600	Radio Beijing, China	4200 ^{as}	11815 ^{as}	15165 ^{as}
1500-1600	Radio Jordan, Amman	9560 ^{??}		
1500-1600	Radio Luxembourg	15350 ^{om}		
1500-1600	Radio Nigeria, Lagos	4990 ^{do}	7285 ^{do}	

1500-1600	Radio Pyongyang, North Korea	9325 ^{va}	9640 ^{va}	9977 ^{va}
		11760 ^{va}		
1500-1600	Radio RSA, South Africa	7230 ^{af}	15210 ^{af}	15270 ^{af}
1500-1600	RTV Malaysia, Radio 4	7295 ^{do}		
1500-1600	SBC Radio 1, Singapore	5010 ^{do}	5052 ^{do}	11940 ^{do}
1500-1600	SLBS, Freetown, Sierra Leone	3316 ^{do}	5980 ^{do}	
1500-1600	Sri Lanka B'casting Corp.	6075 ^{as}	9720 ^{as}	
1500-1600	Voice of Ethiopia, Addis Ababa	9560 ^{af}		
1500-1600 mtwhf	Voice of Kenya, Nairobi	4934 ^{do}		
1500-1600	Voice of Nigeria, Lagos	7255 ^{af}		
1530-1540 mtwhfa	Voice of Greece, Athens	11645 ^{am}	15650 ^{am}	17535 ^{am}
1530-1600	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af}	17895 ^{af}
1530-1600	Radio Sofia, Bulgaria	11735 ^{af}	11840 ^{af}	15370 ^{af}
1530-1600	Radio Sweden, Stockholm	17880 ^{na}	21500 ^{na}	
1530-1600	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af}	11765 ^{af}
1530-1600	Radio Tirana, Albania	9500 ^{af}	11835 ^{af}	
1530-1600	Swiss Radio Int'l, Bern	13685 ^{af}	15430 ^{af}	17830 ^{af}
		21630 ^{af}		
1530-1600	Sudan Nat'l B'casting Corp.	9540 ^{do}	9550 ^{do}	11635 ^{do}
1530-1600 mtwha	Vatican Radio, Vatican City	6185 ^{eu}		
1530-1600	Voice of America, Washington	9700 ^{va}	15205 ^{va}	
1545-1600 mtwhf	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 ^{af}		
1545-1600	Vatican Radio, Vatican City	11715 ^{as}	15090 ^{as}	17870 ^{as}

SELECTED PROGRAMS**Sundays**

1515 BBC: International Recital. The annual series of live classical music concerts from London's BBC Concert Hall (except March 24th, 31st: Concert Hall, recorded classical selections).

1515 Radio Beijing: China Anthology. See S 1115.

1525 Radio Beijing: Music Album. See S 1125.

1538 Swiss Radio Int'l: Feature. See S 0638.

1540 Radio Beijing: Listeners' Letterbox. See S 1140.

Mondays

1515 BBC: Feature/Drama. See M 0101.

1515 Radio Beijing: Current Affairs. See M 1115.

1538 Swiss Radio Int'l: Dateline. See S 0208.

1540 Radio Beijing: Learn to Speak Chinese. See M 1140.

Tuesdays

1515 BBC: A Jolly Good Show. Dave Lee Travis presents requests, the Record of the Month, and the album charts.

1515 Radio Beijing: Current Affairs. See M 1115.

1538 Swiss Radio Int'l: Dateline. See S 0208.

1540 Radio Beijing: Listeners' Letterbox. See S 1140.

Wednesdays

1515 BBC: As We Forgive (except March 27th: Talk). See M 2315.

1515 Radio Beijing: Current Affairs. See M 1115.

1530 BBC: Comedy. A series of -- you guessed it -- comedy programs (except March 27th: Two Cheers for March, a satirical look at the month just past).

1538 Swiss Radio Int'l: Dateline. See S 0208.

1540 Radio Beijing: Learn to Speak Chinese. See M 1140.

Thursdays

1515 BBC: Music for a While with Richard Baker. Classical music with the well-known broadcaster.

1515 Radio Beijing: Current Affairs. See M 1115.

1538 Swiss Radio Int'l: Dateline. See S 0208.

1540 Radio Beijing: Culture in China. See H 1140.

Fridays

1515 BBC: Music Review. See H 2315.

1515 Radio Beijing: Current Affairs or The Business Show. See F 1115.

1538 Swiss Radio Int'l: Dateline. See S 0208.

1540 Radio Beijing: In the Third World. See F 1140.

Saturdays

1515 BBC: Sportsworld. See A 1430.

1515 Radio Beijing: Press Clippings. See S 0015.

1520 Radio Beijing: Travel Talk. See S 0020.

1528 Radio Beijing: Cooking Show. See S 0028.

1535 Radio Beijing: Music from China. See S 0035.

1538 Swiss Radio Int'l: Dateline. See S 0208.

1548 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.

YOUR CONTRIBUTIONS ARE ALWAYS WELCOME IN THE SHORTWAVE GUIDE. SEND ADDITIONS AND CORRECTIONS ON FREQUENCIES, TIMES AND STATIONS TO GREG JORDAN, C/O MT, AND ON PROGRAMMING DETAILS, TO KANNON SHAMUGAM AT THE ADDRESS ON PAGE 58. WE WANT TO STAY THE BEST!



A Voice of Turkey announcer cues up some music.

1600 UTC**[11:00 AM EST/8:00 AM PST]****FREQUENCIES**

1600-1605	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}
1600-1610	Malawi B'casting, Blantyre	3381 ^{do}	
1600-1610	Radio Lesotho, Maseru	4800 ^{do}	
1600-1610	Vatican Radio, Vatican City	11715 ^{as}	15090 ^{as} 17870 ^{as}
1600-1615 sa	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 ^{af}	
1600-1630	Radio Pakistan, Islamabad	13665 ^{me}	15605 ^{me} 17555 ^{me}
		17895 ^{af}	21480 ^{af} 21530 ^{me}
1600-1630	Radio Sofia, Bulgaria	11735 ^{af}	11840 ^{af} 15370 ^{af}
1600-1630 mtwhf	Vatican Radio, Vatican City ^{ml}	6248 ^{eu}	7250 ^{eu} 9645 ^{eu}
		11740 ^{eu}	15210 ^{eu}
1600-1630	Voice of America, Washington	6110 ^{as}	7125 ^{as} 9645 ^{as}
		9700 ^{va}	15205 ^{va} 15395 ^{as}
1600-1630	Voice of Vietnam, Hanoi	9840 ^{eu}	12020 ^{eu} 15010 ^{eu}
1600-1640	UAE Radio, Dubai, United Arab Emirates	15320 ^{af}	15435 ^{eu} 21605 ^{eu}
1600-1650	Deutsche Welle, Koln, Germany	6170 ^{as}	7225 ^{as} 9615 ^{as}
		11785 ^{as}	15105 ^{as} 15240 ^{as}
		15595 ^{as}	17995 ^{as}
1600-1700	BSKSA Saudi Arabia	9705 ^{eu}	9720 ^{eu}
1600-1700	Radio 1, Accra, Ghana ¹	4915 ^{do}	
1600-1700	Radio 2, Accra, Ghana	7295 ^{do}	
1600-1700	Radio Beijing, China	4130 ^{af}	9570 ^{af} 15110 ^{af}
		15130 ^{af}	
1600-1700	BBC London, England	5975 ^{va}	7325 ^{va} 9410 ^{va}
		12095 ^{va}	15070 ^{va}
1600-1700	Radio Jordan, Amman	9560 ^{??}	

1600-1700	R. Korea, Seoul, South Korea	5975 ^{om}	9870 ^{af}
1600-1700	Radio Luxembourg	15350 ^{om}	
1600-1700	Radio Nigeria, Lagos	4990 ^{do}	
1600-1700	Radio RSA, South Africa	7230 ^{af}	15210 ^{af} 15270 ^{af}
1600-1700	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af} 11765 ^{af}
1600-1700	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af} 17895 ^{af}
1600-1700	SLBS, Freetown, Sierra Leone	3316 ^{do}	5980 ^{do}
1600-1700	Sri Lanka B'casting Corp.	6075 ^{as}	9720 ^{as}
1600-1700 mtwhf	Tristan Radio, Tristan da Cunha	3290 ^{do}	
1600-1700	Voice of America, Washington	9575 ^{af}	11920 ^{af} 15410 ^{af}
		15580 ^{af}	17800 ^{af} 21625 ^{af}
1600-1700 mtwhf	Voice of Kenya, Nairobi	4934 ^{do}	
1600-1700	Voice of Nigeria, Lagos	7255 ^{af}	
1610-1615 mtwhf	Radio Botswana, Gaborone	5955 ^{af}	7255 ^{af}
1615-1630 s	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 ^{af}	
1615-1630 mh	Radio Budapest, Hungary	7220 ^{eu}	9585 ^{eu} 9835 ^{eu}
		11910 ^{eu}	15160 ^{eu} 15220 ^{eu}
1615-1700	Swiss Radio Int'l, Bern ¹	11955 ^{eu}	
1630-1700	Radio Cairo, Egypt	15255 ^{af}	
1630-1700 mtwhf	RTV Morocco, Rabat	15335 ^{af}	15360 ^{af} 17595 ^{af}
1630-1700	Voice of America, Washington	6110 ^{as}	7125 ^{as} 9645 ^{as}
		9700 ^{va}	9760 ^{va} 11710 ^{va}
		15205 ^{va}	15245 ^{va} 15395 ^{as}

PROGRAMS**Sundays**

- 1600 Radio Norway Int'l: Norway Today. See S 0100.
- 1615 BBC: Feature (except March 3rd: The Jews of Eastern Europe). See S 0230.
- 1615 Radio Beijing: China Anthology. See S 1115.
- 1625 Radio Beijing: Music Album. See S 1125.
- 1630 Radio Netherlands: Happy Station. See S 1130.
- 1640 Radio Beijing: Listeners' Letterbox. See S 1140.
- 1645 BBC: Letter from America. See S 0545.

Mondays

- 1615 BBC: New Ideas. A look at new products and technological developments.
- 1615 Radio Beijing: Current Affairs. See M 1115.
- 1635 BBC: Give Us Our Daily Bread. Program details not available at press time.
- 1637 Radio Netherlands: Newsline. See S 0037.
- 1640 Radio Beijing: Learn to Speak Chinese. See M 1140.
- 1645 BBC: The World Today. News analysis on a selected location or event in the news.
- 1652 Radio Netherlands: The Research File. See M 1152.

Tuesdays

- 1615 BBC: Omnibus. A half-hour program on practically any topic.
- 1615 Radio Beijing: Current Affairs. See M 1115.
- 1637 Radio Netherlands: Newsline. See S 0037.

1640 Radio Beijing: Listeners' Letterbox. See S 1140.

1645 BBC: The World Today. See M 1645.

1652 Radio Netherlands: Images. See T 1152.



Victor Grajewsky, head of Kol Israel's international service (far left), sits with other bureaucrats.

Wednesdays

- 1615 BBC: On Stage. See T 0630.
- 1615 Radio Beijing: Current Affairs. See M 1115.
- 1637 Radio Netherlands: Newsline. See S 0037.
- 1640 Radio Beijing: Learn to Speak Chinese. See M 1140.
- 1645 BBC: The World Today. See M 1645.
- 1652 Radio Netherlands: Feature. See W 1152.

Thursdays

- 1615 BBC: Assignment. See H 0230.
- 1615 Radio Beijing: Current Affairs. See M 1115.
- 1637 Radio Netherlands: Newsline. See S 0037.
- 1640 Radio Beijing: Culture in China. See H 1140.
- 1645 BBC: The World Today. See M 1645.
- 1652 Radio Netherlands: Media Network. See H 1152.

Fridays

- 1615 BBC: Science in Action. The latest in scientific developments.
- 1615 Radio Beijing: Current Affairs or The Business Show. See F 1115.
- 1637 Radio Netherlands: Newsline. See S 0037.
- 1640 Radio Beijing: In the Third World. See F 1140.
- 1645 BBC: The World Today. See M 1645.
- 1652 Radio Netherlands: Airtime Africa. Music, discussion with studio guests, and analysis of the issues that concern both Europe and Africa.

Saturdays

- 1600 Radio Norway Int'l: Norway Today. See S 0100.
- 1615 BBC: Sportsworld. See A 1430.
- 1615 Radio Beijing: Press Clippings. See S 0015.
- 1620 Radio Beijing: Travel Talk. See S 0020.
- 1628 Radio Beijing: Cooking Show. See S 0028.
- 1635 Radio Beijing: Music from China. See S 0035.
- 1637 Radio Netherlands: Newsline. See S 0037.
- 1652 Radio Netherlands: Over to You. See S 0052.

1700 UTC**[12:00 PM EST/9:00 AM PST]****FREQUENCIES**

1700-1705	Radio 2, Accra, Ghana	7295 _{do}		
1700-1710	Radio Bafoussam, Cameroon ¹	4000 _{do}		
1700-1725	Radio Netherlands, Hilversum	6020 _{af}	15570 _{af}	
1700-1728	SLBS, Freetown, Sierra Leone	3316 _{do}	5980 _{do}	
1700-1730	Radio Jordan, Amman	9560 _{??}		
1700-1730	Sri Lanka B'casting Corp.	6075 _{as}	9720 _{as}	
1700-1730	Voice of America, Washington	3980 _{va}	6040 _{va}	6110 _{as}
		7125 _{as}	9645 _{as}	9700 _{va}
		9760 _{va}	15205 _{va}	15395 _{as}
		9705 _{eu}	9720 _{eu}	
1700-1800	B'casting Service of the Kingdom of Saudi Arabia, Riyadh			
1700-1800	Radio 1, Accra, Ghana ¹	4915 _{do}		
1700-1800	Radio Africa, Equatorial Guinea	7190 _{af}		
1700-1800	Radio Beijing, China	4130 _{af}	7405 _{af}	8260 _{af}
		9570 _{af}	11575 _{af}	
1700-1800	Radio Cairo, Egypt	15255 _{af}		
1700-1800	Radio Luxembourg	15350 _{om}		
1700-1800	Radio RSA, South Africa	7230 _{af}	15210 _{af}	15270 _{af}
		17790 _{af}	17835 _{af}	
1700-1800	Radio Tanzania, Dar es Salaam	5985 _{af}	9684 _{af}	11765 _{af}
1700-1800	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}
1700-1800	mtwhfa RTV Morocco, Rabat	15335 _{af}	17595 _{af}	17815 _{af}
1700-1800	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
1700-1800	Radio Pyongyang, North Korea	9325 _{va}	9640 _{va}	9977 _{va}
		11760 _{va}		

1700-1800	Voice of America, Washington	9575 _{af}	11920 _{af}	15410 _{af}
		15580 _{af}	17800 _{af}	21625 _{af}
1700-1800	BBC London, England	5975 _{va}	7325 _{va}	9410 _{va}
		12095 _{va}	15070 _{va}	
1700-1800	mtwhf Voice of Kenya, Nairobi	4934 _{do}		
1700-1800	Voice of Nigeria, Lagos	7255 _{af}		
1700-1800	war Voice of Peace, Baghdad, Iraq	6055 _{me}	11860 _{me}	21675 _{me}
1706-1800	Radio 2, Accra, Ghana	3366 _{do}		
1715-1730	Radio Buea, Cameroon ¹	3970 _{do}		
1715-1800	Radio Pakistan, Islamabad	11570 _{eu}	15605 _{eu}	
1728-1800	SLBS, Freetown, Sierra Leone	3316 _{do}		
1730-1745	Radio Bayrak, Cyprus	6150 _{va}		
1730-1745	a Radio Douala, Cameroon	4795 _{do}		
1730-1800	Radio Austria Int'l, Vienna	5945 _{eu}	6155 _{eu}	12010 _{me}
		13730 _{af}		
1730-1800	Radio Romania Int'l, Bucharest	15365 _{af}	17720 _{af}	17805 _{af}
1730-1800	Vatican Radio, Vatican City	17710 _{af}	17730 _{af}	21650 _{af}
1730-1800	Voice of America, Washington	6040 _{va}	6110 _{as}	6180 _{va}
		7125 _{as}	9645 _{as}	9700 _{va}
		9760 _{va}	11710 _{va}	11960 _{va}
		15205 _{va}	15395 _{as}	
1740-1800	Cameroon Radio-TV, Yaounde	4850 _{do}		
1745-1800	mtwhfa Radio Douala, Cameroon	4795 _{do}		
1745-1800	RTV Madagascar, Antananarivo	3232 _{do}	3286 _{do}	5005 _{do}

1800 UTC**[1:00 PM EST/10:00 AM PST]****FREQUENCIES**

1800-1810	Malawi B'casting, Blantyre	3381 _{do}		
1800-1830	Radio Cairo, Egypt	15255 _{af}		
1800-1830	Radio Sweden, Stockholm	6065 _{va}	9655 _{va}	11900 _{va}
1800-1830	RTV Congolaise, Brazzaville ¹	3265 _{af}	4765 _{af}	
1800-1830	Voice of Vietnam, Hanoi	9840 _{eu}	12020 _{eu}	15010 _{eu}
1800-1840	w Radio Bertoua, Cameroon	4750 _{do}		
1800-1845	mtwhfa Radio Douala, Cameroon	4795 _{do}		
1800-1900	All India Radio, Delhi	11935 _{af}		
1800-1900	B'casting Service of the Kingdom of Saudi Arabia, Riyadh	9705 _{eu}	9720 _{eu}	
1800-1900	Cameroon Radio-TV, Yaounde	4850 _{do}		
1800-1900	Radio 1, Accra, Ghana ¹	4915 _{do}		
1800-1900	Radio 2, Accra, Ghana	7295 _{do}		
1800-1900	Radio Africa, Equatorial Guinea	7190 _{af}		
1800-1900	Radio Luxembourg	15350 _{om}		
1800-1900	Radio Mozambique, Maputo	3265 _{af}	4855 _{af}	9618 _{af}
1800-1900	BBC London, England	5975 _{va}	7325 _{va}	9410 _{va}
		12095 _{va}	15070 _{va}	17885 _{va}
1800-1900	smtwhf Radio New Zealand Int'l	15130 _{pa}		
1800-1900	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
1800-1900	Radio Tanzania, Dar es Salaam	5985 _{af}	9684 _{af}	11765 _{af}
1800-1900	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}
1800-1900	SLBS, Freetown, Sierra Leone	3316 _{do}		
1800-1900	Voice of America, Washington	9575 _{af}	11920 _{af}	15410 _{af}
		15580 _{af}	17800 _{af}	21625 _{af}

1800-1900	Voice of America, Washington	6040 _{va}	6180 _{va}	9700 _{va}
		9760 _{va}	15205 _{va}	
1800-1900	mtwhf Voice of Kenya, Nairobi	4934 _{do}		
1800-1900	war Voice of Peace, Baghdad, Iraq	6055 _{me}	11860 _{me}	21675 _{me}
1800-1830	a Radio Riga Int'l, Latvia, USSR	5935 _{eu}		
1815-1830	Kol Israel, Jerusalem	11585 _{eu}	11655 _{eu}	
1815-1900	Radio Bangladesh, Dhaka	12030 _{as}	15255 _{as}	
1815-1830	Radio Voice of Lebanon, Beirut	6549.5 _{me}		
1830-1855	BRT, Brussels, Belgium	5910 _{eu}	17550 _{eu}	21810 _{af}
1830-1900	Radio Afghanistan, Kabul	7310 _{eu}	9635 _{eu}	
1830-1900	Radio Netherlands, Hilversum	6020 _{af}	15570 _{af}	17605 _{af}
		21685 _{af}		
1830-1900	Radio Sofia, Bulgaria	11735 _{af}	11840 _{af}	15370 _{af}
1830-1900	Radio Tirana, Albania	7120 _{eu}	9480 _{eu}	
1830-1900	Sri Lanka B'casting Corp.	9720 _{eu}	15120 _{eu}	
1830-1900	Swiss Radio Int'l, Bern	9885 _{af}	11955 _{af}	
1840-1845	Voice of Greece, Athens	11645 _{af}	12105 _{af}	15650 _{af}
1845-1900	Ghana B'casting Corp., Accra	6130 _{af}		
1845-1900	RTV Guinea, Conakry	4900 _{af}	7125 _{af}	
1845-1900	s RTV Mali, Bamako ³	4783 _{do}	5995 _{do}	7285 _{do}
		11960 _{do}		

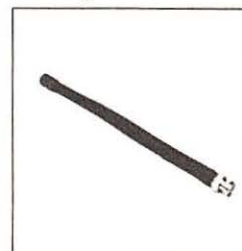
1900 UTC**[2:00 PM EST/11:00 AM PST]****FREQUENCIES**

1900-1915	Radio Tanzania, Dar es Salaam	5985 _{af}	9684 _{af}	11765 _{af}
1900-1925	Radio Netherlands, Hilversum	6020 _{af}	15570 _{af}	17605 _{af}
		21685 _{af}		
1900-1930	Radio Afghanistan, Kabul	7310 _{eu}	9635 _{eu}	
1900-1930 t	Radio Budapest, Hungary	6110 _{eu}	7220 _{eu}	9520 _{eu}
		9585 _{eu}	9835 _{eu}	11910 _{eu}
1900-1930	Radio Sofia, Bulgaria	11735 _{af}	11840 _{af}	15370 _{af}
1900-1930	Voice of Vietnam, Hanoi	9840 _{eu}	12020 _{eu}	15010 _{eu}
1900-1945	Cameroon Radio-TV, Yaounde	4850 _{na}		
1900-1950	Deutsche Welle, Köln, Germany	9760 _{af}	11785 _{af}	11810 _{af}
		13790 _{af}	15350 _{af}	15390 _{af}
		17810 _{af}		
1900-2000	All India Radio, Delhi	11935 _{af}		
1900-2000	B'casting Service of the Kingdom of Saudi Arabia, Riyadh	9705 _{eu}	9720 _{eu}	
1900-2000	Ghana B'casting Corp., Accra	6130 _{af}		
1900-2000	Radio 1, Accra, Ghana ¹	4915 _{do}		
1900-2000	Radio 2, Accra, Ghana	7295 _{do}		
1900-2000	Radio Africa, Equatorial Guinea	7190 _{af}		
1900-2000	Radio Algiers, Alger, Algeria	9640	15215	
1900-2000	Radio Beijing, China	6955 _{af}	9440 _{af}	11515 _{af}
1900-2000	Radio Havana Cuba	15435 _{eu}		
1900-2000	Radio Luxembourg	15350 _{om}		
1900-2000 smtwhf	Radio New Zealand Int'l	15130 _{pa}		
1900-2000	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
1900-2000	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}
1900-2000 s	RTV Morocco, Rabat	15335 _{af}		
1900-2000	SLBS, Freetown, Sierra Leone	3316 _{do}		

1900-2000	Sri Lanka B'casting Corp.	9720 _{eu}	15120 _{eu}	
1900-2000	Voice of America, Washington	9575 _{af}	11920 _{af}	15410 _{af}
		15580 _{af}	17800 _{af}	21625 _{af}
1900-2000	BBC London, England	5975 _{va}	7325 _{va}	9410 _{va}
		12095 _{va}	15070 _{va}	17885 _{va}
1900-2000	Voice of America, Washington	6040 _{va}	6180 _{va}	9525 _{as}
		9700 _{va}	9760 _{va}	11710 _{va}
		11870 _{as}	15180 _{as}	15205 _{va}
1900-2000 mtwhf	Voice of Kenya, Nairobi	4934 _{do}		
1900-2000	Voice of Nigeria, Lagos	7255 _{af}		
1900-1915	Radio Botswana, Gaborone	3356 _{af}		
1920-1930	Radio Buea, Cameroon ¹	3970 _{do}		
1930-1940	Radio Austria Int'l, Vienna	5945 _{eu}	6155 _{eu}	12010 _{me}
		1370 _{af}		
1930-1940 irr	Radio Burkina, Burkina Faso	4815 _{af}	7230 _{af}	
1930-2000	Radio Budapest, Hungary	6110 _{eu}	7220 _{eu}	9520 _{eu}
		9585 _{eu}	9835 _{eu}	11910 _{eu}
1930-2000	Radio Romania Int'l, Bucharest	5990 _{eu}	7195 _{eu}	9690 _{eu}
1930-2000	Radio Sofia, Bulgaria	6070 _{eu}	7155 _{eu}	15370 _{eu}
1930-2000	Radio Sweden, Stockholm	6065 _{va}	7265 _{va}	
1930-2000	Voice of the Islamic Republic of Iran, Tehran	6030 _{eu}	9022 _{eu}	
1935-1955	RAI, Rome, Italy	7275 _{eu}	9710 _{eu}	11800 _{eu}
1935-1945	RTV Togo, Lome	5047 _{af}		
1940-2000 smwha	Ulaanbaator Radio, Mongolia	11850 _{eu}	12015 _{eu}	
1945-2000 mwf	Tristan Radio, Tristan da Cunha	3290 _{do}		
1950-2000	Sudan Nat'l B'casting Corp.	9540 _{do}	9550 _{do}	11635 _{do}

Improve Your Scanning Coverage!

GRE America is proud to introduce a new family of products to enhance your scanning pleasure! First, GRE has designed the new **Super Converter 9001** for base model scanners. The 9001 converts 810 MHz - 950 MHz down to 410 MHz - 550 MHz. The 9001 is the perfect alternative to buying a new, expensive scanner covering the 800 MHz band. Next, GRE announces the new **Super Amplifier 3001** for base model scanners. The 3001 will increase gain by as much as 20 dB, and is engineered to help scanners with low sensitivity pull in weak signals. Both products use BNC connectors, (1) 9 volt battery and have an off/pass switch for returning to normal operation.

**Super Converter 9001 & Super Amplifier 3001****Super Converter II****Super Amplifier****All-Band Antenna**

U.S. & International Distributorship inquiries welcome. Please call GRE for further information!

Let GRE Manufacture Your Radio Products!

GRE America, Inc. is a leading OEM developer and manufacturer of radio telecommunications products such as:

- Cordless Telephones
- CB & Marine Radios
- Spread Spectrum "engines"
- Remote Monitoring Systems

If you need a high quality, cost competitive, reliable manufacturer, GRE will provide you with a free production quotation.

For more information, please call GRE at (800) 233-5973. GRE is a subsidiary of General Research of Electronics, Inc.

GRE GRE America, Inc.

GRE America, Inc.

425 Harbor Blvd., Belmont, California 94002

(415) 591-1400 Outside California: (800) 233-5973

2000 UTC**[3:00 PM EST/12:00 PM PST]****FREQUENCIES**

2000-2010 w	Malawi B'casting, Blantyre	3381 _{do}		
2000-2010 mtwhf	Voice of Kenya, Nairobi	4934 _{do}		
2000-2010 smwha	Ulaanbaatar Radio, Mongolia	11850 _{eu}	12015 _{eu}	
2000-2030	Kol Israel, Jerusalem	7465 _{na}	9435 _{na}	11605 _{na}
		11630 _{af}		
2000-2030	Radio Romania Int'l, Bucharest	5990 _{eu}	7195 _{eu}	9690 _{eu}
2000-2030	Swiss Radio Int'l, Bern ¹	3985 _{eu}	6165 _{eu}	9535 _{eu}
2000-2030	Voice of Nigeria, Lagos	7255 _{af}		
2000-2100	B'casting Service of the Kingdom of Saudi Arabia, Riyadh	9705 _{eu}	9720 _{eu}	
2000-2100	King of Hope, Lebanon	6280 _{me}		
2000-2100	Radio 1, Accra, Ghana ¹	4915 _{do}		
2000-2100	Radio 2, Accra, Ghana	7295 _{do}		
2000-2100	Radio Africa, Equatorial Guinea	7190 _{af}		
2000-2100	Radio Beijing, China	9440 _{af}	11715 _{af}	15110 _{af}
2000-2100	Radio Beijing, China	4130 _{eu}	8260 _{eu}	9920 _{eu}
		11500 _{eu}		
2000-2100	BBC London, England	5975 _{va}	7325 _{va}	9410 _{va}
		12095 _{va}	15070 _{va}	17885 _{va}
2000-2100	Radio Havana Cuba	11850 _{eu}	15435 _{eu}	
2000-2100	Radio Luxembourg	15350 _{om}		
2000-2100 smtwhf	Radio New Zealand Int'l	15130 _{pa}		
2000-2100	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
2000-2100	Radio Pyongyang, North Korea	9345 _{va}	9640 _{va}	9977 _{va}
2000-2100 s	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}

2000-2100	SLBS, Freetown, Sierra Leone	3316 _{do}		
2000-2100 mwf	Tristan Radio, Tristan da Cunha	3290 _{do}		
2000-2100	Voice of America, Washington	9570 _{af}	15410 _{af}	15580 _{af}
		17800 _{af}	21485 _{af}	21625 _{af}
2000-2100	Voice of America, Washington	6040 _{va}	6180 _{va}	9700 _{va}
		9760 _{va}	11710 _{va}	15205 _{va}
2000-2100	Voice of Indonesia, Jakarta	7125 _{as}	9675 _{as}	11752 _{as}
		11785 _{as}		
2005-2100	Radio Damascus, Syria	12085 _{na}	15095 _{na}	
2010-2100 sa	Voice of Kenya, Nairobi	4934 _{do}		
2015-2030	Voix de la Revolution Benin	4870 _{af}	5025 _{af}	
2015-2045 sth	Voice of Resistance of Black Cockerel (Angolan clandestine)	9700 _{af}		
2025-2045	RAI, Rome, Italy	7235 _{me}	9575 _{me}	11800 _{me}
2030-2100	Radio Cairo, Egypt	15375 _{af}		
2030-2100	R. Korea, Seoul, South Korea	6480 _{eu}	7550 _{af}	15575 _{eu}
2030-2100	Radio Netherlands, Hilversum	9895 _{af}	11660 _{af}	13700 _{af}
2030-2100	Voice of Vietnam, Hanoi	9840 _{eu}	12020 _{eu}	15010 _{eu}
2045-2100	All India Radio, Delhi	7412 _{eu}	9665 _{eu}	9910 _{eu}
		11620 _{eu}	11715 _{eu}	15265 _{eu}
2050-2100	Vatican Radio, Vatican City	6248 _{eu}	7250 _{eu}	

2100 UTC**[4:00 PM EST/1:00 PM PST]****FREQUENCIES**

2100-2105	Radio Damascus, Syria	12085 _{na}	15095 _{na}	
2100-2110	Malawi B'casting, Blantyre	3381 _{do}		
2100-2110	Vatican Radio, Vatican City	6248 _{eu}	7250 _{eu}	
2100-2111 smtwhf	Radio New Zealand Int'l	15130 _{pa}		
2100-2125	Radio Netherlands, Hilversum	9895 _{af}	11660 _{af}	13700 _{af}
2100-2130	King of Hope, Lebanon	6280 _{me}		
2100-2130	Radio Budapest, Hungary	6110 _{eu}	7220 _{eu}	9520 _{eu}
		9585 _{eu}	9835 _{eu}	11910 _{eu}
2100-2130	Radio Romania Int'l, Bucharest	5990 _{eu}	6105 _{eu}	7105 _{eu}
		7195 _{eu}	9690 _{eu}	
2100-2130	Swiss Radio Int'l, Bern	12035 _{af}	13635 _{af}	15525 _{af}
2100-2130	Vatican Radio, Vatican City	17710 _{af}	17730 _{af}	21650 _{af}
2100-2150	Deutsche Welle, Koln, Germany	9760 _{as}	9765 _{as}	11785 _{as}
		13780 _{as}	15350 _{as}	
2100-2200	Radio 1, Accra, Ghana ¹	4915 _{do}		
2100-2200	Radio 2, Accra, Ghana	7295 _{do}		
2100-2200	Radio Africa, Equatorial Guinea	7190 _{af}		
2100-2200	Radio Baghdad, Iraq	13660 _{eu}		
2100-2200	Radio Beijing, China	4130 _{eu}	9920 _{eu}	11500 _{eu}
2100-2200	Radio Cairo, Egypt	15375 _{af}		
2100-2200	Radio Luxembourg	15350 _{om}		
2100-2200	Radio Nacional de Angola, Luanda	3355 _a	9535 _{af}	
2100-2200	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
2100-2200	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}
2100-2200	SLBS, Freetown, Sierra Leone	3316 _{do}		
2100-2200 mwf	Tristan Radio, Tristan da Cunha	3290 _{do}		

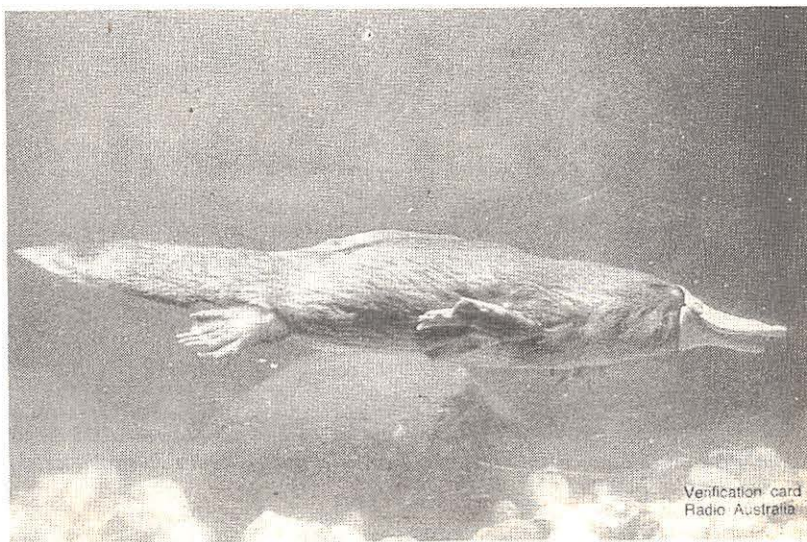
2100-2200	Voice of America, Washington	15410 _{af}	15580 _{af}	17800 _{af}
		21485 _{af}	21625 _{af}	
2100-2200	BBC London, England	5975 _{va}	7325 _{va}	9410 _{va}
		12095 _{va}	15070 _{va}	17885 _{va}
2100-2200	Voice of America, Washington	6040 _{va}	6180 _{va}	9700 _{va}
		9760 _{va}	11710 _{va}	11870 _{as}
		11960 _{va}	15185 _{as}	15205 _{va}
		17735 _{as}		
2100-2200 war	Voice of Peace, Baghdad, Iraq	6055 _{me}	11860 _{me}	21675 _{me}
2100-2200	Voice of Turkey, Ankara	9795 _{eu}		
2110-2200	Radio Damascus, Syria	12085 _{na}	15095 _{na}	
2111-2200 mtwhfa	Radio New Zealand Int'l	17770 _{pa}		
2115-2200	Radio Cairo, Egypt	9900 _{eu}		
2115-2130 s	Radio Republik Indonesia Jayapura	6070 _{do}		
2130-2145	Radio Buea, Cameroon ¹	3970 _{do}		
2130-2200 smtwhf	King of Hope, Lebanon	6280 _{me}		
2130-2200	Radio Sofia, Bulgaria	6070 _{eu}	7155 _{eu}	9700 _{eu}
2145-2200	Cameroon Radio-TV, Yaounde	4850 _{na}		

2200 UTC**[5:00 PM EST/2:00 PM PST]****FREQUENCIES**

2200-2210	Radio Bafoussam, Cameroon ¹	4000 _{do}	
2200-2210	Radio Damascus, Syria	12085 _{na}	15095 _{na}
2200-2215	Cameroon Radio-TV, Yaounde	4850 _{na}	
2200-2215	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af} 17895 _{af}
2200-2225	BRT, Brussels, Belgium	5910 _{eu}	9925 _{eu} 15515 _{af}
2200-2225	RAI, Rome, Italy	5990 _{as}	9710 _{as} 11800 _{as}
2200-2230	All India Radio, Delhi	7412 _{eu}	9665 _{eu} 9910 _{eu}
		11620 _{eu}	11715 _{eu} 15265 _{eu}
2200-2230	Radio Beijing, China	3985 _{eu}	
2200-2230 a	Radio Republik Indonesia Kupang	3385 _{do}	4805 _{do}
2200-2230	Radio Sweden, Stockholm	6065 _{va}	
2200-2230	Voice of the UAE, Abu Dhabi	9600 _{??}	11985 _{??} 13605 _{??}
	United Arab Emirates		
2200-2245	Radio Cairo, Egypt	9900 _{eu}	
2200-2300	DZAS, Metro-Manila, Philippines ¹	6030 _{do}	
2200-2300	Radio 1, Accra, Ghana ¹	4915 _{do}	
2200-2300	Radio 2, Accra, Ghana	7295 _{do}	
2200-2300 sa	Radio Africa, Equatorial Guinea	7190 _{af}	
2200-2300	Radio Baghdad, Iraq	13660 _{eu}	
2200-2300	Radio Havana Cuba	7215 _{eu}	
2200-2300	Radio Luxembourg	15350 _{om}	
2200-2300 smtwhf	Radio New Zealand Int'l	17770 _{pa}	
2200-2300	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}
2200-2300 smtwha	RTV Malaysia, Radio 4	7295 _{do}	

2200-2300	SBC Radio 1, Singapore	5010 _{do}	5052 _{do} 11940 _{do}
2200-2300	SLBS, Freetown, Sierra Leone	3316 _{do}	
2200-2300	Voice of America, Washington	7120 _{as}	9530 _{va} 9770 _{as}
		11760 _{as}	11905 _{va} 11960 _{va}
		15185 _{as}	15225 _{va} 15290 _{as}
		15305 _{as}	15445 _{va} 17735 _{as}
		17820 _{as}	17885 _{va}
2200-2300	BBC London, England	5975 _{va}	7325 _{va} 9410 _{va}
		12095 _{va}	15070 _{va} 17885 _{va}
2200-2300	Voice of Free China, Taiwan	5950 _{na}	9852 _{eu} 11805 _{eu}
		11740 _{ca}	11860 _{as} 15345 _{as}
2200-2300 WAR	Voice of Peace, Baghdad, Iraq	6055 _{me}	11860 _{me} 21675 _{me}
2205-2300	Vatican Radio, Vatican City	7125 _{as}	9615 _{as} 11830 _{as}
2230-2300	Capital Radio, Abu Dhabi	9600 _{??}	11985 _{??} 13605 _{??}
	United Arab Emirates		
2230-2300	Kol Israel, Jerusalem	7465 _{na}	9435 _{na} 11605 _{na}
		11655 _{na}	17575 _{sa}
2230-2300	Radio Sofia, Bulgaria	9700 _{eu}	11680 _{eu}
2230-2300	Radio Tirana, Albania	7215 _{eu}	9480 _{eu}
2230-2300 war	Radio Vilnius, Lithuania, USSR	6100 _{eu}	9675 _{eu}
2230-2300	Swiss Radio Int'l, Bern ¹	6190 _{eu}	
2245-2300	Voice of Greece, Athens	9425 _{am}	12105 _{am}

QSL's from Brian Johnson, San Diego, California: from Radio Syria, a picture of the Kosmo Hotel from Radio Moscow, and the platypus from Radio Australia.



Verification card
Radio Australia

2300 UTC**[6:00 PM EST/3:00 PM PST]****FREQUENCIES**

2300-2315	DZAS, Metro-Manila, Philippines ¹	6030 _{do}
2300-2305	Radio 1, Accra, Ghana ¹	4915 _{do}
2300-2305	Radio 2, Accra, Ghana	7295 _{do}
2300-2330	Radio Sofia, Bulgaria	9700 _{eu} 11680 _{eu}
2300-2330	war Radio Vilnius, Lithuania, USSR	6100 _{am} 7400 _{am} 9750 _{am}
		15180 _{am} 17690 _{am} 17720 _{am}
2300-2330	Vatican Radio, Vatican City ^{mu}	6185 _{eu}
2300-0000	Radio Luxembourg	15350 _{om}
2300-0000	smtwhf Radio New Zealand Int'l	17770 _{pa}
2300-0000	Radio Pyongyang, North Korea	11700 _{na} 13650 _{na}
2300-0000	Radio Thailand, Bangkok	4830 _{as} 9655 _{as} 11905 _{as}
2300-0000	smtwha RTV Malaysia, Radio 4	7295 _{do}
2300-2000	SBC Radio 1, Singapore	5010 _{do} 5052 _{do} 11940 _{do}
2300-0000	SLBS, Freetown, Sierra Leone	3316 _{do}
2300-0000	BBC London, England	5975 _{va} 7325 _{va} 9410 _{va}
		12095 _{va} 15070 _{va} 17885 _{va}

2300-0000	Voice of America, Washington	7120 _{as} 9530 _{va} 9770 _{as}
		11760 _{as} 11905 _{va} 11960 _{va}
		15185 _{as} 15225 _{va} 15290 _{as}
		15305 _{as} 15445 _{va} 17735 _{as}
		17820 _{as} 17885 _{va}
2300-0000	Voice of Turkey, Ankara	9445 _{na} 9665 _{me} 9685 _{eu}
		17760 _{as}
2300-0000	Voice of the UAE, Abu Dhabi	9600 _{??} 11985 _{??} 13605 _{??}
	United Arab Emirates	
2315-0000	All India Radio, Delhi	9535 _{as} 9910 _{as} 11715 _{as}
		11745 _{as} 15110 _{as}
2330-0000	Radio Sweden, Stockholm	9695 _{ja} 11705 _{ja}
2330-0000	Radio Tirana, Albania	6120 _{na} 9760 _{na} 11825 _{na}
2330-0000	Voice of Vietnam, Hanoi	9840 _{as} 12020 _{as} 15010 _{as}

PROGRAMS**Sundays**

2300 Kol Israel: Easy Hebrew. Hebrew language lessons for English speakers.
 2305 BBC: Words of Faith. See S 0540.
 2310 BBC: Book Choice. See S 0225.
 2315 BBC: Letter from America. See S 0545.
 2330 BBC: Feature. See S 1401.

Monday

2305 BBC: Commentary. Background to the news from a wide range of specialists.
 2310 BBC: Financial News. News of commodity prices and significant moves in currency and stock markets.
 2315 BBC: As We Forgive. Christians tell stories of forgiveness in this season of Lent (except March 25th: Talk, a short talk on any subject

under the sun).

2330 BBC: Multitrack 1: Top 20. Tim Smith presents what's hot on the British pop music charts.

Tuesdays

2305 BBC: Commentary. See M 2305.
 2310 BBC: Financial News. See M 2310.
 2315 BBC: International Recital (except March 26th: Concert Hall). See S 1515.

Wednesdays

2300 Kol Israel: Easy Hebrew. See S 2300.
 2305 BBC: Commentary. See M 2305.
 2310 BBC: Financial News. See M 2310.
 2315 BBC: Good Books. See M 0315.
 2330 BBC: Multitrack 2. Graham Bannerman presents new pop records, interviews, news, and competitions.

Thursdays

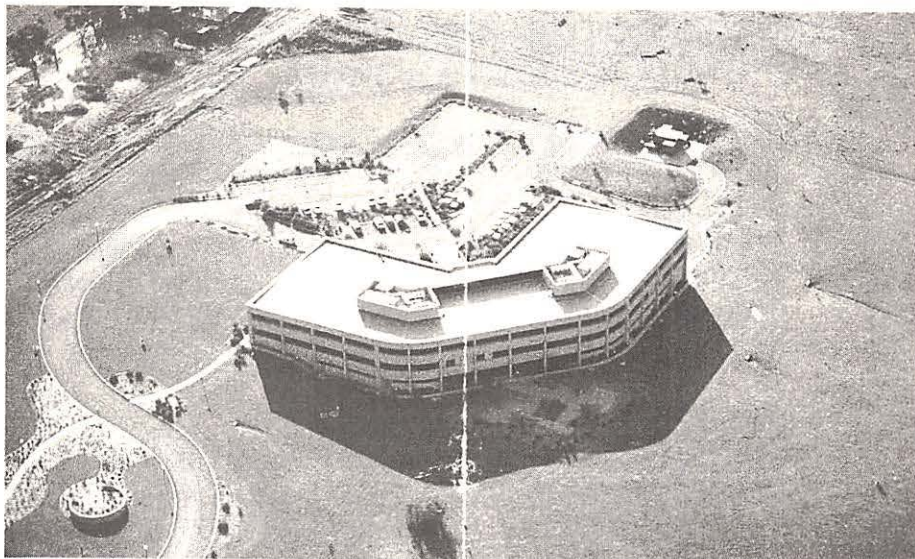
2305 BBC: Commentary. See M 2305.
 2310 BBC: Financial News. See M 2310.
 2315 BBC: Music Review. Classical music events and developments from around the world.

Fridays

2300 Kol Israel: Easy Hebrew. See S 2300.
 2305 BBC: Commentary. See M 2305.
 2310 BBC: Financial News. See M 2310.
 2315 BBC: Worldbrief. A roundup of the week's news headlines and human-interest happenings.
 2330 BBC: Multitrack 3. Sarah Ward surveys the British alternative music scene.

Saturdays

2305 BBC: Words of Faith. See S 0540.
 2310 BBC: Book Choice. See S 0245.
 2315 BBC: A Jolly Good Show. See T 1515.



Radio Australia's studios in Burwood East, Victoria -- Radio Australia celebrated 50 years of broadcasting in 1989.

MT columnists welcome your input and response to their columns. Please address your letter to the author c/o Monitoring Times P.O. Box 98 Brasstown, NC 28902

If you request a personal response, always enclose a self-addressed, stamped envelope (SASE).



THE JAPAN RADIO CO. **NRD-535**

THE NEXT GENERATION IN HIGH-PERFORMANCE HF RECEIVERS

Once again JRC breaks new ground in shortwave receiver design. The new NRD-535 has all the features SWLs and amateurs have been waiting for. General coverage from 0.1 to 30 MHz in AM, USB, LSB, CW, RTTY, FAX and Narrow FM modes. Advanced ECSS operation for phase-lock AM reception. Variable bandwidth control (BWC). Tuning accuracy to 1 Hz possible with direct digital synthesis. 200 memory channels with scan and sweep operation. Triple Superheterodyne receiving

system. Superb sensitivity, selectivity and image rejection. Dual-width noise blanker eliminates impulse noise. Squelch, RF Gain, Attenuator, AGC and Tone controls. Optional RTTY demodulator available. 24 hour clock/timer. Easy to read vacuum fluorescent display with digital S-meter. AC and DC operation. Plus the most comprehensive computer interface found on any radio to date. Call or write today for a full color brochure, price list and dealer information.



Japan Radio Co., Ltd.

MAIN OFFICE: Akasaka Twin Tower (Main), Akasaka 2-chome, Minato-ku, Tokyo 107, JAPAN
Tel.: (03) 584-8836 Telex: 242-5420 JRCTOK J

IN U.S.A.: 430 Park Avenue (2nd Floor), New York, NY 10022
Tel.: (212) 355-1180 FAX: (212) 319-5227 Telex: 961114 JAPAN RADIO NYK

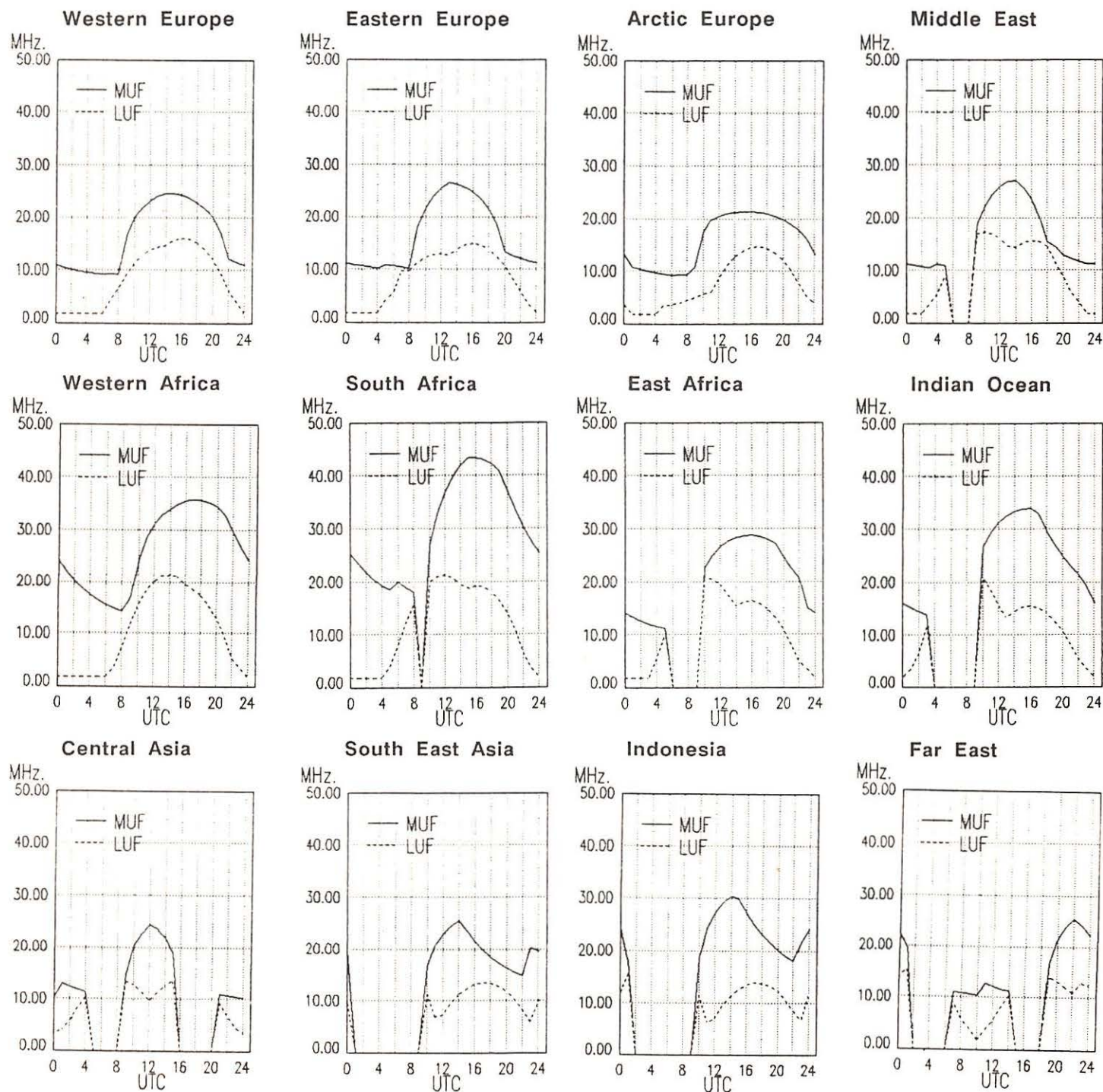
How to use the propagation charts

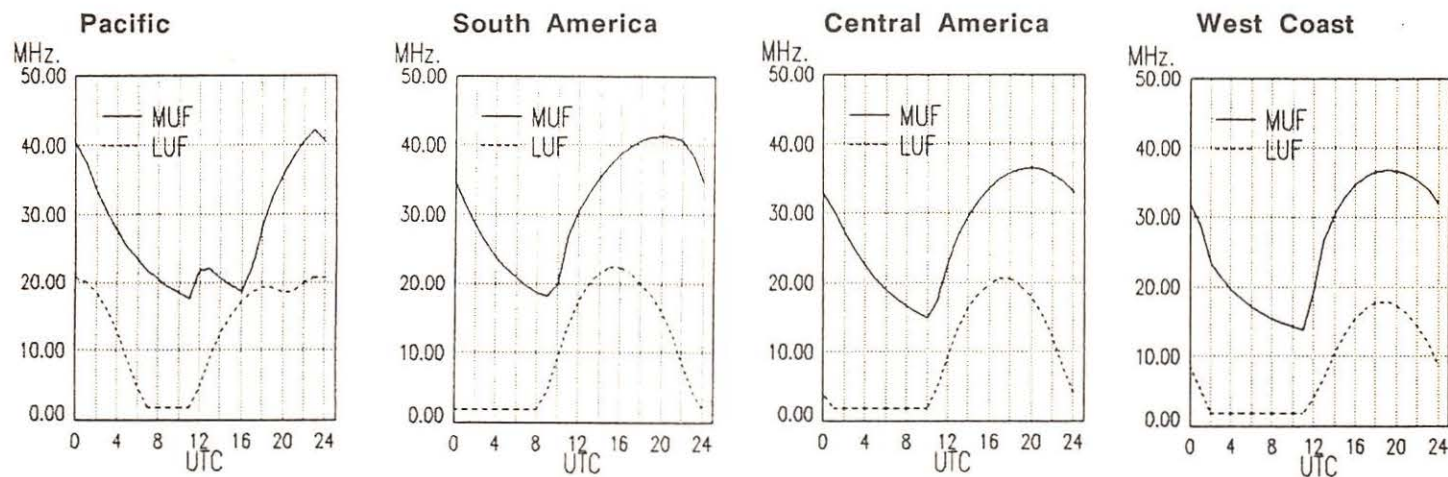
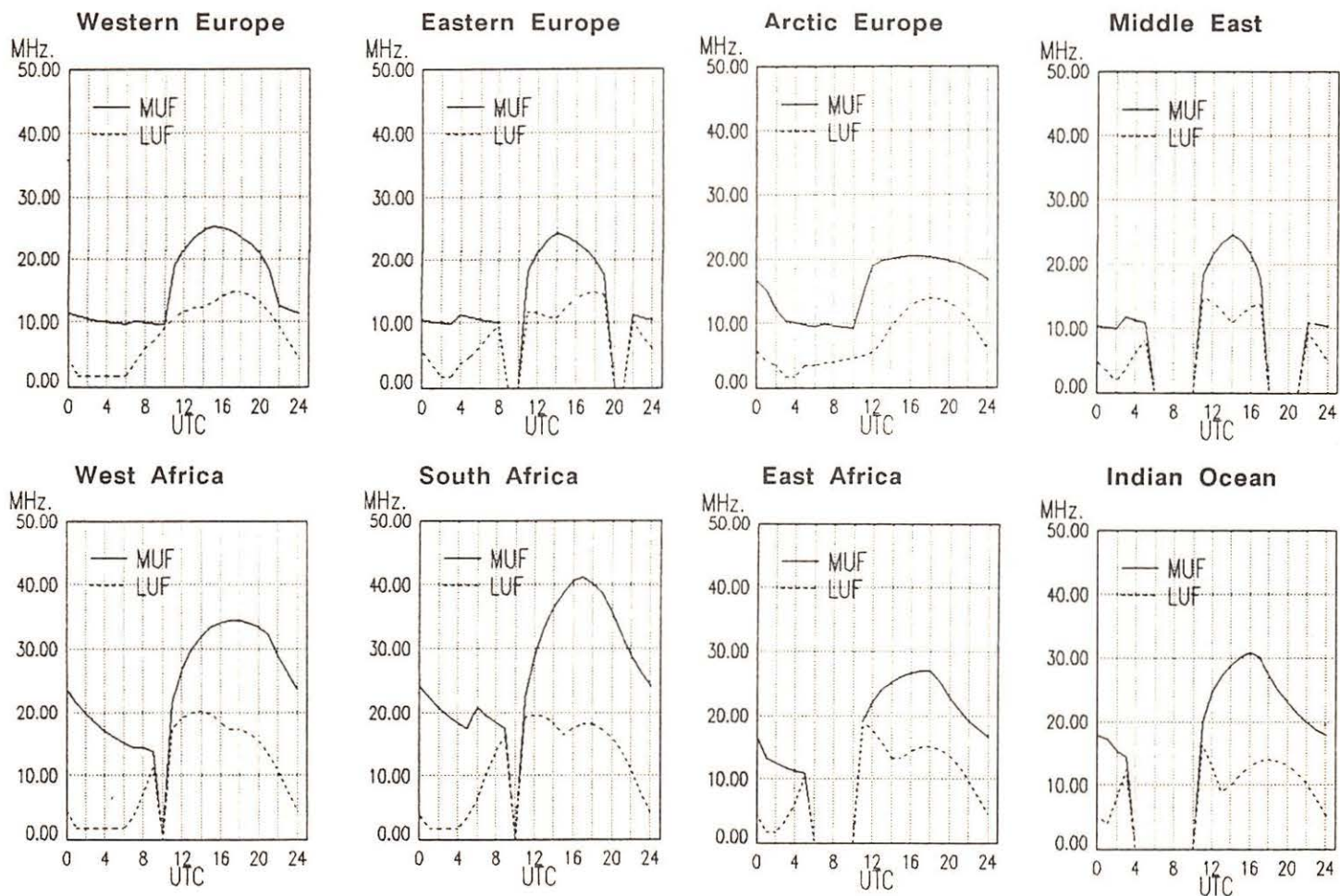
Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location (they are divided into east coast, midwest and west coast of North America). Then look for the one most closely describing the geographic location of the station you want to hear.

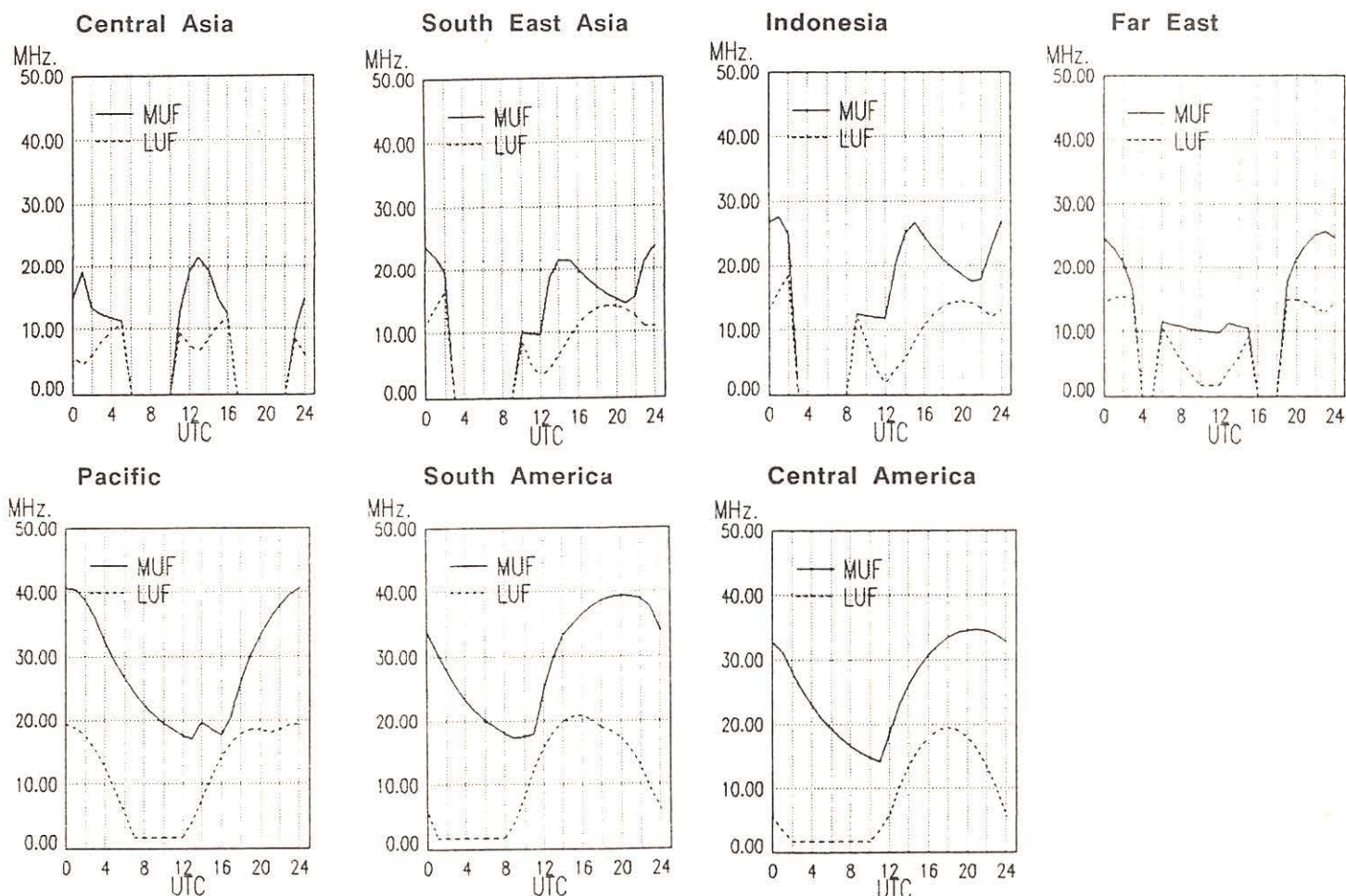
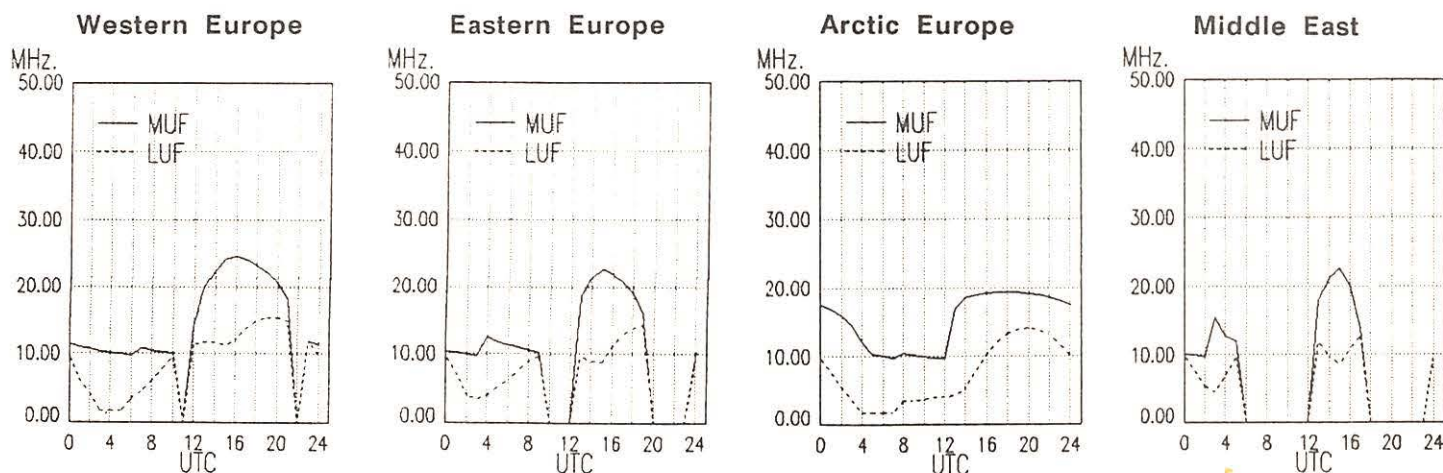
Once you've located the correct charts, look along the horizontal axis of the graph for the time that you are listening. The top line of the graph shows the Maximum Usable Frequency (MUF) and the lower line the Lowest Usable Frequency (LUF) as indicated on the vertical axis of the graph.

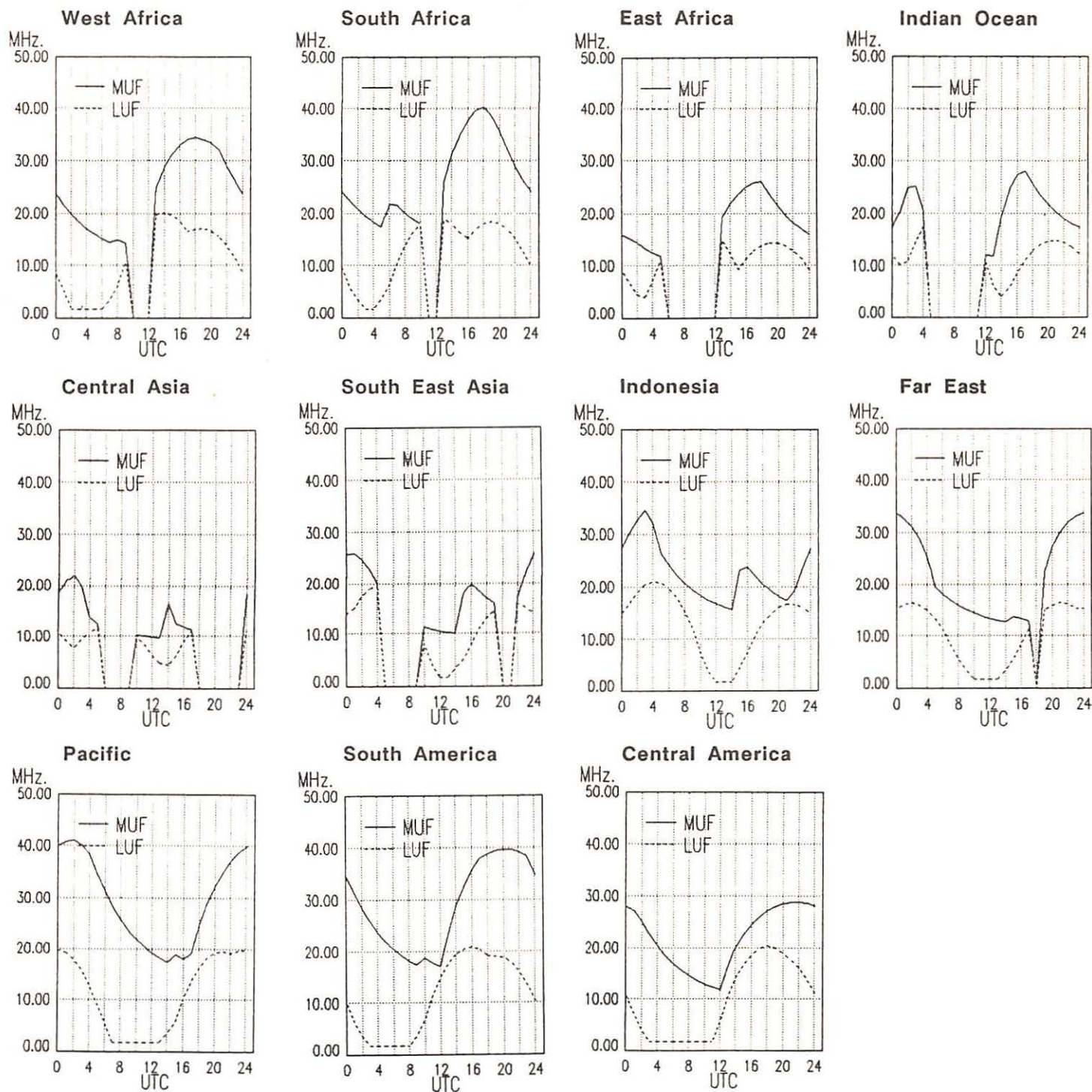
While there are exceptions to every rule (especially those regarding shortwave listening), you should find the charts helpful in determining the best times to listen for particular regions of the world. Good luck!

Propagation conditions between the EAST COAST and ...



Propagation conditions between the EAST COAST and ...**Propagation conditions between the MIDWEST and ...**

Propagation conditions between the MIDWEST and ...**Propagation conditions between the WEST COAST and ...**

Propagation conditions between the WEST COAST and ...

Grundig's COSMOPOLIT Worldband Cassette Recorder



The Gulf war has brought about such a huge and sudden demand for world band radios that dealers' shelves in the United States, and to some extent other countries, have been all but swept clean.

That's not all. No less than 10,000 *Passport to World Band Radio* books went out of the warehouse in a single two-day period just after the war commenced.

Grundig Alleviates Receiver Shortage

Radio Shack says it will be another three months before they will have restocked their stores, and it will probably be another couple of months before Sangeans begin to reappear, as well. Sony hasn't answered our calls or faxes, but presumably their models will be a while in coming, too.

However, in all this there are some solutions. Grundig has announced that they're importing all models except their Satellit 650 via Emery Air Express, so they are able to keep dealers well stocked with radios.

Only Worldband Cassette Recorder Available

One of these models is the Grundig Cosmopolit, a \$249.95 worldband cassette recorder (WCR). Over half North American households own a video cassette recorder (VCR). So you'd think that with world band radio sales taking off like a rocket there would be a number of worldband cassette recorders from which to choose.

Not so. There are a number of "boom box" recorders and the like out there with some crude coverage of the shortwave spectrum. But there's hardly any halfway serious world band radios available with recorders built in.

Sony offers a couple, but these are analog devices that allow for only one event to be recorded. Worse, these models aren't even offered to us

peasants in the United States or Canada.

But with Grundig's Cosmopolit, all isn't lost. It's a compact portable with cassette built right in. The Cosmo is cleverly constructed to be as small as possible, with the radio's dial serving as the cover for the cassette cavity.

Analog Tuning Circuitry Offers Reasonable Coverage

It comes with a digital clock that operates from either the 24 or 12 hour standard -- good news for world band listeners. Unfortunately, that's the only thing that's digital about this radio. Like the Sony WCRs, there's only an analog needle-and-dial tuning setup with one-event recording. That's not much, but it's more than any other firms are offering in the northern half of the Western Hemisphere.

The Cosmo, which is made at Grundig's own plant in Indonesia, covers the AM band to just above 1600 kHz; the usual FM band, in stereo if you use headphones; plus shortwave 5.85-6.3, 7-7.5, 9.4-10, 11.5-12.15, 13.45-13.95, 15.05-15.7 and 17.4-18.1 MHz in the 49, 41, 31, 25, 22, 19 and 16 meter bands. That's pretty good

coverage for a simple analog portable. It's obvious that, except for the AM band, which is about to be expanded to 1700 kHz, Grundig's engineers thought the frequency coverage out carefully.

Few "Bells and Whistles"

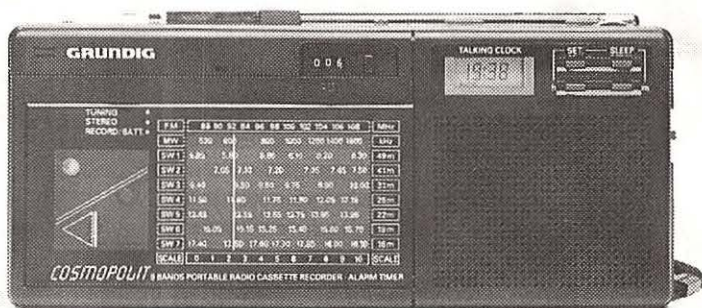
Tuning is via a knurled thumbwheel, which is okay if you don't change stations very often. But it's stiff and tiring to operate constantly, as in bandscanning. As the Cosmo is an analog-tuned model, it doesn't offer keypad tuning, presets, or any other advanced tuning aids.

Because so much money goes into the radio's recorder, there's not much left over for some of the things we tend to take for granted in better portables. There's no travel power switch, for example, so the set can inadvertently be switched on in your suitcase, running down the batteries. And the telescopic antenna doesn't rotate at its swivel, which can be a nuisance.

Good FM Performance, but Shortwave only Fair

The set's performance tends to follow this same pattern. On one hand, FM reception is quite good, with high sensitivity and a good capture ratio, even though it has a very strong automatic frequency control circuit that limits reception of weak stations alongside powerful ones.

On the other hand, AM and shortwave performance are both pedestrian. Sensitivity and selectivity are only fair, while the whistles



and braaps from poor image rejection can drive you up the wall. The audio is pretty mediocre, too. So, in all, this sounds like a \$90 radio, which is hardly surprising. Except for the recorder and clock/timer, that's just about what it is.

The Cosmo doesn't come with an AC power supply or headphones, although both can be obtained easily enough from electronic stores. A nice small touch is that the set's AC power socket is center-pin negative, like Japanese models. A number of other models offered by European firms have been center-pin positive, so seeing a worldwide standard evolve is always good news. After all, if you use an outboard power supply with the wrong polarity, you might ruin your set.

The Bottom Line

In all, Grundig's Cosmopolit is hardly exciting. But it is good enough for casual shortwave listening applications that call for an all-in-one world band radio recorder, and it's a nice size for traveling. News reporters, among others, should like it.

Insofar as we know, no other manufacturer expects to introduce a world band recorder in the near future. One firm had an exciting digital model ready to be brought out about now, but scrubbed these plans when they found that demand for their other world band models was so high that they didn't have the available production capacity to bring out a new model.

Perhaps next year there'll be something better, but for now it looks as though North Americans can have all the world band recorders they want...so long as they're Cosmos.

Hear Larry Magne's equipment reviews the first Saturday of each month, plus PASSPORT editors Don Jensen and Tony Jones the third Saturday, over Radio Canada's "SWL Digest," 7:35 PM ET on 5960 and 9755 kHz, with a repeat Tuesday at 8:30 AM ET on 9635, 11855 and 17820 kHz.

PASSPORT'S "RDI White Paper" equipment reports are available in the U.S. from Universal Shortwave and EEB; in Canada from PIF, C.P. 232, L.d.R., Laval PQ H7N 4Z9; in Europe from Interbooks, 8 Abbot Street, Perth PH2 0EB, Scotland, and Lowe Electronics stores; and in Japan from IBS-Japan, 5-31-6 Tamanawa, Kamakura 247. For complete list, send self-addressed stamped envelope to RDI White Papers, Box 300M, Penn's Park PA 18943 USA.

"MT is an integral part of my listening hobby. I consider it an irreplaceable component in my shack!"

-- 1991 reader's survey

OUR 23RD YEAR!

SERVING SPECIALIZED COMMUNICATORS

6
ISSUES PER
YEAR



48-56
PAGES
PER
ISSUE!

FULL COVERAGE FSTV, SSTV, FAX,
RTTY, PACKET, TVRO, SATELLITES,
MICROWAVE AND COMPUTERS

THE SPEC-COM JOURNAL

Official Publication of
The UNITED STATES ATV SOCIETY

\$20.00 USA \$25.00 CANADA \$30.00 DX

Office (319) 557-8791

Facsimile (319) 323-5825

Computer BBS (319) 582-3235

P.O. Box 1002

Dubuque, Iowa 52004

CQ Amateur Radio Buyer's Guide

You can buy with confidence when you have all the facts. The 1991 Equipment Buyer's Guide gives you in-depth coverage of HF/VHF/UHF rigs and accessories. All the information is here in one handy, concise directory with descriptions, technical specifications, model numbers, retail prices and photographs. How do you get a ham license? What's the latest on the code-free license? What equipment do you really need to work the satellites? Should you buy a computer for your shack? How do you add computer control to your rig? You can buy with confidence when you have all the facts. Order the 1991 Equipment Buyer's Guide today!

You'll need the Antenna Buyer's Guide to squeeze every last dB out of your antenna dollars. Make sure you get the best possible antenna system for the best price! HF and VHF/UHF, directional and omnidirectional, vertical and horizontal, mobile and portable—they are all covered in depth. Tuners, cables, wattmeters and more! You'll find charts, specifications, photos and retail prices. Advice on getting the proper tower and antenna permits from a leading authority on PRB-1. Step-by-step guide to putting up your first beam! The bands are hotter than ever right now. You can't afford to wait.

1990 ANTENNA BUYER'S GUIDE



ORDER YOUR BUYER'S GUIDE TODAY!

Don't miss the single most valuable buying guide in the Amateur Radio field. Send only \$4.95 today. Foreign: \$6. U.S. funds. Foreign orders are payable in U.S. funds only by check drawn on a U.S. bank, or by U.S. Postal Service Money Order.

YES, please send my copy of 1990 EQUIPMENT BUYER'S GUIDE for only \$4.95 (Foreign \$6.00) postage paid.

Date _____ Number of Copies _____

Name _____ Call _____

Address _____

City _____ State _____ Zip _____

Card No. _____ ☐ Check ☐ MasterCard ☐ VISA Expires _____

Signature _____

(Signature required on all charge orders)
Mail to: CQ Communications, Inc.
76 North Broadway, Hicksville, NY 11801

Scanner Boosters: Those Precarious Preamps

One of the most misunderstood accessories available to the hobbyist is the radio frequency preamplifier, or "preamp" for short. The term refers to the fact that it works at radio (not audio) frequencies, that it amplifies (increases) the incoming signal, and that it is connected before (pre-) the device it is supposed to help.

Preamps may be broadband (intended for general purpose amplification over a wide frequency range) or tuned (peaked for a specific frequency or narrow swath of frequencies).

Generally speaking, the tuned preamps do a better job because they can be optimized for a specific band and have the lowest noise figure, but they are useless for use with wide-frequency-coverage scanners.

That noise factor is a key to a good preamp. Transistors and resistors generate their own (thermal) noise which adds to the background noise ("hiss"). The lower the noise factor, the better weak-signal sensitivity.

The Trap

The best way to make a weak signal stronger is with a preamp, right? WRONG -- unless you are located way out in the boonies and the strongest signal is a McDonald's order window. If you are like the majority of scanner owners, you have a number of local repeaters, and preamps can cause more headaches than they can cure.

Start by selecting the best antenna and coaxial cable you can find and mount that antenna high and clear. If signals are still weak, then consider a preamp. If most signals are very strong, you don't want a preamp! You may already be suffering from strong signal overload and haven't recognized the symptoms.

Do you hear two or more signals at the same time on one frequency? Do you hear TV or broadcast FM voices or music where you should be hearing two-way radio? Do you hear the same signal on multiple frequencies? Read on.

The Limitation

Your scanner is capable of processing a

limited range of signal strengths; we call this its "dynamic range," and it's expressed in decibels (dBs), using a 1 millivolt (one thousandth of a volt) signal as a standard reference (0 dBm). For example, if your scanner can clearly receive a weak 0.7 microvolt signal (-110 dBm) and hold up under a blistering 70 millivolt signal barrage (-10 dBm), the dynamic range would be 100 dB (darned good -- your scanner won't do it!).

At those higher signal levels, the scanner's own RF amplifier transistors begin to distort, causing the notorious "intermod" (intermodulation distortion), where you hear the same signal over many different frequencies, often mixed with other signals; and "dynamic compression" (desensitization), an overall reduction in scanner sensitivity when the transistors begin to "shut down" (cease to amplify) in the presence of such a signal onslaught.

Clearly, then, adding a preamp when there are already strong signals present can only aggravate the conditions described above. The preamp itself can succumb to intermod and desensitization, just like the scanner.

So When Should You Use a Preamp?

Some preamps work better than others in a strong signal environment. Generally speaking, the more costly preamps have the wider dynamic range, while still affording good sensitivity (low noise figure).

Some users are perplexed by the fact that even when they live in a deep fringe, adding a preamp might not help some frequency bands. The reason is that if the scanner already has a very low noise RF amplifier, the addition of the preamp does nothing but make the background hiss stronger -- it doesn't have a noise figure lower than that of the scanner.

This is especially true on the lower frequency bands. Commonly, a preamp adds nothing to low band (30-50 MHz) sensitivity, barely-perceptible improvement at high band (150-174 MHz), more noticeable improvement at UHF (406-512 MHz), and a substantial effect at microwave (806-960

MHz). It all depends upon whether the preamp has a lower noise figure than the scanner RF amplifier at each frequency range.

Can Filters Help?

An appropriate filter placed between the antenna and the preamp will dramatically reduce interference from strong, unwanted signals. Such filters for scanners are hard to find; at present, only the Grove FTR-5 Scanner Filter is commonly available. It substantially lowers the overload from TV and FM broadcast signals and has one adjustment to allow the user to reject any one frequency in the 100-200 MHz range.



While the FTR-5 works very well, it must be remembered that the adjustable frequency is not razor-sharp; adjacent frequencies will also be attenuated somewhat. But this is an acceptable trade-off in strong-signal areas where a slight reduction in the strength of desired signals will not be noticed.

Mastmount Versus Indoor Preamps

We have all heard that the best place to put a preamp is right at the antenna, not at the scanner. This is theoretically true, but is not always necessary. The advantage of such placement is that it helps to overcome signal-absorbing losses in the coax line by boosting the weak signals above the level at which the coax loss would make them unintelligible.

But if we use low-loss cable, especially in short runs, mast mounting is unnecessary. For example, even at 900 MHz, Belden 9913 coax offers only 2 dB loss and the popular TV RG-6/U only 3.5 dB for 50 feet of cable; only the most barely-perceptible signals would experience some audible loss. At lower frequencies the loss is substantially less; no signal degradation would be heard.

With lossier cables or longer lengths, a mast-mounted preamp makes sense, but they

Build a Multipurpose Broadband Amplifier

It is said that good things come in small packages. Certainly, this can be a misstatement in some cases. When it comes to small broadband RF preamplifiers, for example, it's not necessarily true. Have you been unable to test a particular circuit when using a scope, only to discover that the signal level at the circuit sampling point was too low to provide a meaningful reading on the scope display? How about those mini signals that won't trigger your frequency counter? The list of these examples is extensive if you are a workshop inhabitant.

This article describes a simple, inexpensive preamp that provides 20 dB of gain from below the standard broadcast band (540-1600 kHz) band through the lower end of the VHF spectrum. In fact, it exhibits useful gain well into the VHF region, but the output level is less than across the flat portion of the normal 3-dB response curve.

Broadband preamp objectives

A good preamplifier should exhibit a 50-ohm input and output characteristic, since most test instruments are designed for a 50-ohm interface. The amplifier response needs to be relatively flat (within 1 dB) across its operating range. In other words, the gain is constant from, say, 1.5 to 50 MHz. Also, a broadband amplifier must be unconditionally stable, which means it does not self-oscillate even when there is no 50-ohm termination at the input and output circuits.

A final criterion is that the amplifier faithfully reproduce the input waveform at its output terminal. This requires the amplifier to be a linear type of circuit. Class A operation is preferred for this application.

An amateur radio linear power amplifier operates on the same principle. The main difference is that the ham amplifier delivers many watts of RF output power. Most linear instrument amplifiers provide only milliwatts of output power.

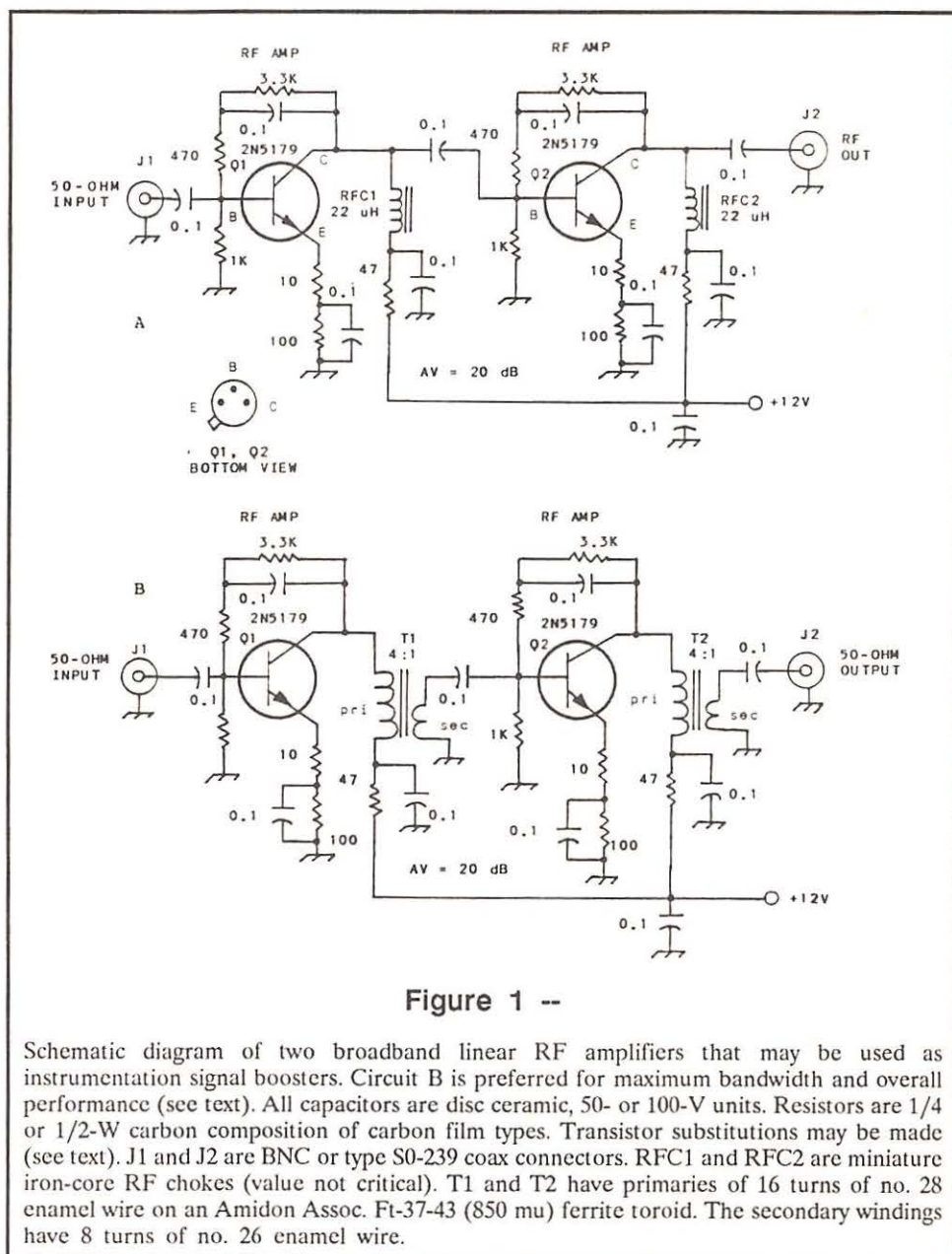
Circuit description

Our 20-dB preamplifier is shown schematically in Figure 1. The circuit at A may be used if you wish to simplify this project. It differs from circuit B only because RF chokes are used in place of broadband toroidal transformers. The RF chokes limit

the low frequency response of the amplifier. As shown, circuit A is relatively flat in response from 2 to 60 MHz. The circuit in Figure 1B is flat from approximately 100 kHz through 60 MHz.

I prefer to use the broadband transformers (T1 and T2) because they provide a better impedance match between the stages and between Q2 and the output

load. Q1 and Q2 have natural input impedances (at their bases) of 50 ohms, whereas the collector impedance is on the order of 200 ohms. T1 and T2 provide the necessary 4:1 impedance transformation to ensure maximum amplifier gain: Maximum power transfer can occur only when unlike impedances are matched. This rule applies to any type of amplifier or system. Likewise with antennas and their feed lines.



You will observe that the circuits in Figure 1 have shunt and degenerative feedback. The shunt feedback is between the collector and base of each transistor. Some of the energy is fed back to the amplifier input. This output energy is 180 degrees out of phase with the signal applied to the input of the transistor. Self-oscillation would occur if the input and output signals were of the same phase.

The required negative feedback reduces the amplifier gain somewhat, since part of the output power is used for feedback energy. Shunt feedback helps to keep the amplifier gain constant across the design operating range. The lower the operating frequency in MHz, the lower the stage gain. This also enhances amplifier stability.

The unbypassed 10-ohm emitter resistors at Q1 and Q2 provide degenerative feedback. This is done to cause the inputs of Q1 and Q2 to exhibit a 50-ohm characteristic. Degenerative feedback also causes a small loss in stage gain -- a worthwhile tradeoff for the good effects it causes.

Amplifier Construction Hints

A smooth-operating broadband amplifier can be built if you keep Q1 and Q2 in a straight line respective to one another. Specifically, don't allow the Q2 output circuit to wrap around to the Q1 input circuit. This encourages unwanted feedback that can cause amplifier instability. All of the component leads need to be as short and direct as practicable to further discourage instability and to ensure proper frequency response.

Also, if you build this circuit on a PC board, I suggest that you use a double-sided board. The copper on the component side of the board can then serve as a ground plane if it is connected at several points to the ground foil on the etched side of the board. Single-sided board material may be used successfully if you maintain a proper circuit layout, as discussed previously.

The 2N5179 transistors are designed for CATV use, mainly. They have a very high f_T (upper frequency limit), which ensures maximum gain in the VHF and UHF spectrum. Any NPN high-gain transistor may be substituted if the f_T is on the order of 900 MHz or greater. A 2N2222A may be used if you are willing to reduce the upper frequency response to 30 MHz. The component values for the circuit remain the same, irrespective of the transistor used.

The completed amplifier should be installed in a small metal box to prevent unwanted pickup of stray RF energy, such as that from a nearby commercial AM or FM station. Coax connectors at the ends of the box may be used to provide input and output connections for the amplifier.

Summary remarks

You may cascade four of the Figure 1 amplifier stages to create a 40-dB broadband amplifier. An amplifier gain control may be included if you wish to vary the gain. This can be done by replacing the 100-ohm fixed-value emitter resistor for Q2 with a 500-ohm potentiometer.

Sophisticated Monitoring

UNIVERSAL M-7000



If you are monitoring only voice shortwave stations, you are missing half the action! Thousands of shortwave stations transmit in non-voice modes such as Morse code, various forms of radioteletype and FAX. The Universal M-7000 will permit you to easily intercept and decode these transmissions. This is the most sophisticated surveillance decoder available. No computer is required. See the world of shortwave excitement you have been missing.

UNIVERSAL M-900

For those desiring to copy the basic modes (Morse code, Baudot, Sitor A/B and FAX), we suggest the affordable M-900. From \$499.95

Huge Communications Catalog

The new Universal 92 page communications catalog covers everything that is new for the amateur, shortwave listener and scanner enthusiast. Equipment, antennas, books and accessories are all shown with prices. Available for \$1 postpaid.

Universal Radio
1280 Aida Dr. Dept. MT
Reynoldsburg, OH 43068
☎ Toll Free: 800 431-3939
☎ In Ohio: 614 866-4267

Universal has been serving radio enthusiasts since 1942. Visit our large showroom east of Columbus, Ohio.

WHAT IF MY MT IS LATE?

If your copy of MT doesn't show up on your doorstep, please wait until the 10th of the month before calling us. We can replace up to two issues per year, but give the Post Office a chance to deliver it first!

Some circuits to be tested can't tolerate a direct 50-ohm connection without an impairment to performance. If you need to attach the preamp to a sensitive sampling point, use a 10-pF capacitor between the sampling point and the 50-ohm cable to the input of the preamp (Q1). This will reduce the loading effect caused by the preamplifier.

The circuit in Figure 1 may be used also as an amplifier for a receiving antenna by placing it between the 50-ohm feed line and the input of your receiver. The noise figure of this amplifier is not low. Therefore, it is not suitable for boosting receiver sensitivity above 14 MHz. A grounded-gate MPF102 JFET may be used ahead of the preamp for this application if you wish to reduce the overall noise figure.

This circuit is excellent also for increasing the sensitivity of a diode type of field-strength meter. Many other uses will become apparent to you after you build the circuit.

mt

Modifying the Argo

QRPers take note; This month is Ten-Tec Argonaut modification month. Necessity is the mother of invention and this statement is especially true when dealing with the Ten-Tec Argonaut series of QRP transceivers. I have had a long-time love/hate relationship with the venerable "Argo." Having owned three 509s and two 515s, I can speak with some authority as to their ruggedness and their need to be modified in order to function as originally intended.

Without a doubt the cute little Argo is one of the cornerstone rigs of low-power operation. Unfortunately, Ten-Tec was unable to "get it right" on three successive productions of this transceiver. The Argonaut is an SSB/CW transceiver that has an output of about four watts on SSB and two watts on CW. It features full QSK (break-in) keying and is a real joy to use on CW.

However, poor receiver performance renders the receiver section in dire need of modification. The transmitter puts out a very clean signal and about the only mod needed is the addition of a Curtis Keyer chip (8044) inside the rig and replacing the key jack with a stereo (tip-ring-sleeve jack) for the paddle input.

1. Replacement of the MPF 132 RF amplifier with a 3N211 MOSFET

Receiver sensitivity is fair on the Argonaut 509 but down-right poor on both model 515s that I've owned. Replacing the RF front end device (an MPF 132 on the front end board) in the Argo with a hot 3N211 MOSFET will cure this problem. The 3N211 has a much better figure, higher gain and is diode protected on the input.

In order to replace the existing RF front end device, the RF front end assembly section must be disassembled and the RF front end board lifted partially out to get at the MPF 132 and de-solder it. The new 3N211 is popped right into the existing holes (all dual gate MOSFETs have the same pin-out) and soldered into place. This is a tedious mod, so work carefully and take your time. Once installed, follow the instructions in the Argonaut manual for retuning the RF front end.

2. Installation of RF attenuators on the receiver input

It is absolutely amazing what 10 dB and 20 dB attenuators can do on a crowded band like 40 meters. Unusually high signal levels can actually degrade receiver performance dramatically. Attenuation of these signals will allow the receiver to perform very well under crowded band conditions and restore a bit of dynamic range to the receiver.

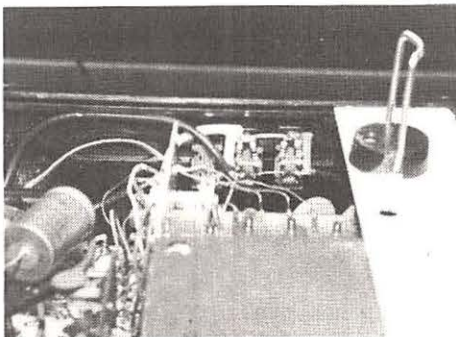


Fig 1: 10 dB and 20 dB RF attenuators glued to the left end panel of an Argonaut 509. Using data from the *ARRL Handbook*, those pads keep a constant 50 ohm impedance at the input to the receiver RF section.

Figure 1 shows the back side of two small slide switches using formulas in the current *ARRL Handbook* (ch 25, pg 25-38 in the 1991 edition). These switches are mounted on either end panel of your Argo (I chose the left end panel as it is closer to the RF front end board). DaTak press-on lettering is used to label the end panel. The pads are placed in the receive antenna line coming from the control board on the top side of the Argo chassis. The RG-174 coax run between the control board (top of chassis) and the RF board (bottom side of chassis) must be replaced to accommodate this mod.

The mod requires lifting several boards off the chassis to re-route the coax. Again, take your time and work carefully. The pads will allow the Argo to function well in a large signal environment while permitting the S-meter to function normally with full AGC action.

3. Replacement of the IF filter with an 8 pole crystal filter

Ten-Tec offers an eight pole crystal filter replacement (including instructions) for the Argonaut 509 and 515. As of last check, this replacement filter was approximately \$70 ordered directly from Ten-Tec at Sevierville, Tennessee, 37862. This is a de-solder and drop-in mod, so details won't be covered here. The combination of this mod and the addition of the 10 and 20 dB pads make the Argo receiver a very respectable performer.

4. Addition of an active AF filter inside the receiver

Ten-Tec had a real desire to sell add-on boxes for their Argonaut series transceivers. They offered two different active AF filters, crystal calibrator, antenna tuner and RF power meter. If you ever took this mess into the bush for a weekend camping trip, you got a real feel for the obvious. Ten-Tec should have included these options inside the Argo case.

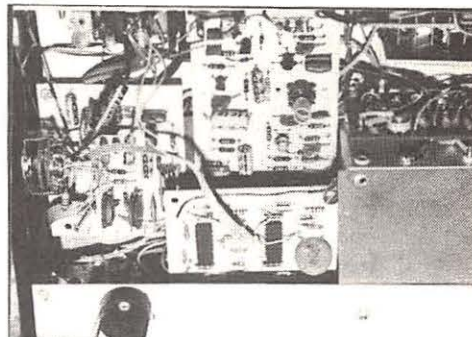


Fig 2: The active audio filter board is shown at the top center of the photo. The four position rotary switch which selects the AF bandwidth is located on the right end panel. In/Output, VCC & ground are picked up from the rear panel accessory jack.

Addition of an active AF filter is pretty straight forward. The Ten-Tec add-on box (AF Filter model 208) was designed to connect the rig via a rear panel accessory connector which placed the filter right in the AGC loop, where it belonged. There are loads of good two and three pole AF filters (mainly for CW use) in *QST*, *CQ*, 73 and the *QRP Quarterly*. Pick one that will fit (try to keep the dimensions about 2 by 3 inches or smaller) and wire it into the AGC loop using the accessory socket on the back panel. Remember to pull the shorting plug from the accessory socket for proper operation.

Figure 2 shows the audio filter sitting on the bottom side of the Argo, bolted to the VFO housing. Cable for switching filter poles is routed to the right end panel and a four-position rotary switch selects the proper filtration. The Argo manual provides excellent diagrams of the unit. Just connect the filter input to pin 5 (filter Input) and the output of the filter to pin 4 (filter Output) as shown in the manual (see Figure 3). VCC (+12VDC) is picked off the center pin on the accessory socket and pin 1 is ground. All that is left is to route the AF bandwidth switch to a nearby end panel, cut a hole, mount the switch and use the DaTak press-on lettering to label the filter positions.

5. Addition of a crystal calibrator inside the receiver

A crystal calibrator is an absolute necessity with any version of the Argonaut. VFO tuning calibration shifts several kHz between bands, and on 10 meters (with models 505 and 509) the tuning ratio increases by a factor of four. Each dial revolution on 80-15 meters equals 25 kHz. On 10 meters each dial revolution equals 100 kHz. The calibrator I used was an old MFJ crystal calibrator that I picked up at a flea market. The box was discarded and the calibrator board was placed inside the Argo on the top side of the chassis, just above the

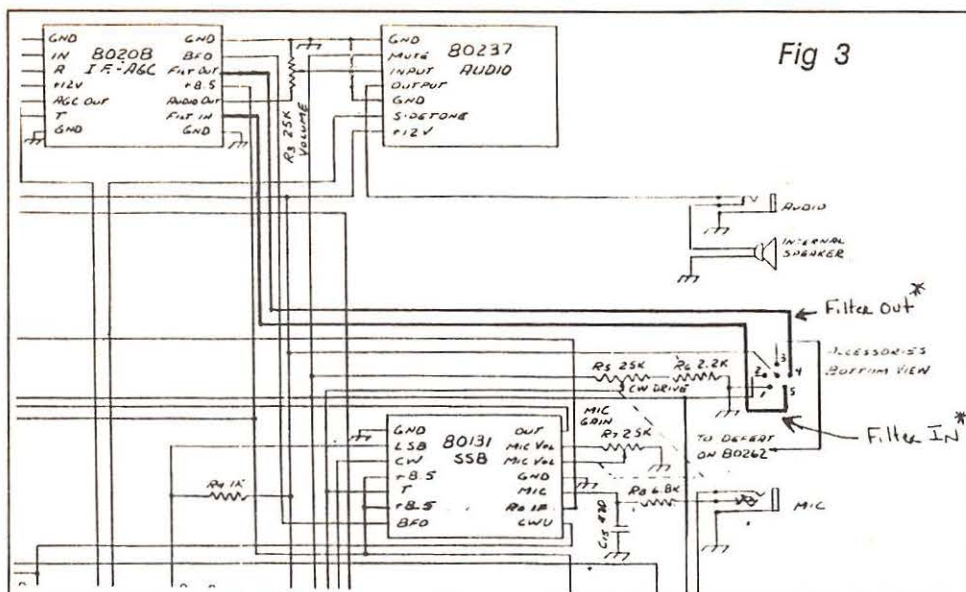


Fig 3

control board assembly and held in place by a standoff glued to the board. +8 VDC and ground were picked off the control board pins and an ON/OFF switch was mounted on the left end panel near the RF attenuator pads. Calibration output was coupled to the attenuator coax going to the RF front end section.

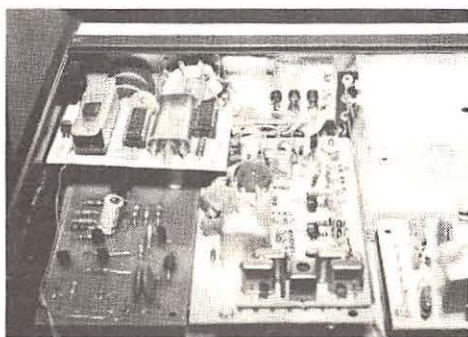


Fig 4: The de-boxed MFJ Xtal Calibrator board is shown at the top-left of this photo. VCC & ground are taken from the control board which is directly beneath the xtal calibrator. Output is coupled to the RF Attenuator coax going to the RF front end board.

Figure 4 shows the crystal calibrator in place above the control board. Notice the three LEDs glued to the back side of the S/RF meter. These LEDs (green, yellow and red) are controlled by the AF filter switch and give a visual indication of the audio bandwidth selected by the audio filter (i.e., green = wide, yellow = narrow, red = extremely narrow). This allows the operator to visually check the bandwidth without glancing around the end of the radio to check the setting of the AF filter switch.

6. Replacement of the antenna connector with an SO-239 or BNC

Figure 5 shows the back of the Argo and the replacement of all RCA phono connectors with the proper RF, audio and power connectors. The replacement of the antenna connector consists of enlarging the existing hole and

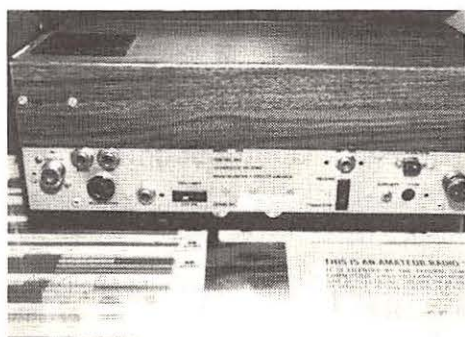


Fig 5: Here's the Argonaut rear panel. Note the antenna jack has been converted to an SO-239. Power connector & key jack have also been modified to replace the standard RCA phono jacks.

putting the SO-239 or BNC chassis connector in place. I absolutely detest the practice of using RCA phono connectors for RF and power connections. They are lossy at RF and exhibit impedance "bumps" that vary with frequency. Getting the proper connector on the RF output will go a long way toward getting maximum RF out to the antenna.

7. Addition of the Curtis 8044 keyer chip inside the radio.

Referring to the ARRL Handbook, Ch 29, pg 29-4, shows a quick and dirty hook-up for the famous Curtis 8044 keyer-on-a-chip. This is an ideal chip for use in the Argo. It can be powered from the regulated 9 VDC source inside the radio. Connections are straight forward with the normal keying jack replaced by a stereo jack wired for dot and dash paddle contacts. Output is taken (via a keying transistor and/or relay combo) to the keying line inside the Argo. Another possibility is the Super CMOS memory keyer detailed in the Nov. '90 issue of QST. This is a one-chip contest keyer that uses digital input from the paddles to control all functions of the keyer including speed, tune-up, sidetone, etc. Either keyer can be mounted on the underside of the chassis and wired into the necessary voltages.

New AOR Scanner

1000 Channels.
8-600MHz,
805-1300
MHz

AR1000
Total Price, Freight Prepaid
(Express Shipping Optional)
\$499

- Continuous coverage (except UHF TV 600-805)
- AM, FM and wide band FM tuning modes.
- 10 Scan Banks, 10 Search Banks
- Selectable Priority Channel
- Selectable Search Increments, 5-955KHz
- Permanent memory backup
- 25 Day Satisfaction Guarantee. Full refund if not Satisfied
- No Frequencies cut out
- All normal accessories included.
- Size: 6 7/8" H x 1 3/4" D x 2 1/2" W
- Wt. 12 oz.

ACE
COMMUNICATIONS

10701 E. 106th St. Indpls., IN 46256
Toll Free 800-445-7717

Visa and Mastercard
(COD slightly higher)
FAX (317) 849-8794



Fig 6: Here's the finished product. A highly modified Argonaut 509 that will hold its own in a contest or ragchewing on 40 meters.

Figure 6 shows the front view of my last Argonaut 509. Note the AF filter switch on the right end panel and the new knobs (available from Radio Shack).

While the mods contained herein provide some real improvement in operating, you obviously do not need to undertake them all. If I had a choice, and could only do one or two of these mods, I would definitely perform the IF filter replacement and the AF filter mod. These two are the biggest bang for the buck.

Till next month. 73s es gud DX.



Monitoring Times invites you to submit your favorite projects for publication.

Antennas for the Simple-Minded

I think that many people hesitate to get into radio monitoring because they believe that, to enjoy the hobby of radio monitoring, you must have an antenna which is long or high or both. Actually, nothing could be farther from the truth. So this month we will discuss some extremely simple and easy to make antennas for people who thought they couldn't have an antenna under their circumstances.

This month's antennas are for people who have no space for antennas, who are all thumbs, who may be unable to do much physically, who don't climb trees or ladders, or who just want to have fun seeing what they can do with extremely simple, or as I will call them "easy" antennas.

The Alligator Strikes:

Let's start with an accessory that will be useful with several of the antennas we'll discuss. It's a piece of insulated wire of a convenient length, say two to 15 feet long depending on your needs, with an alligator clip at one end. Clean the insulation off the wire, and scrape it bright where you connect the alligator clip. The other end is scraped bright and attached to the antenna input-connector of your receiver.

If you have the coaxial-type socket connector on your receiver, plug the free end of the "alligator wire" into the center of the plug. You may have to double it up a bit to make it fit and stay in the connector. If you have a whip antenna on your set, but no antenna connector, put an alligator clip on both ends of the alligator wire and clip one end to the whip antenna.

The alligator wire, in addition to being an antenna lead-in wire, will also function as a "short-wire" antenna. Did you see Bob Grove's comment (*MT*, Jan. 91, pg 98) on the Navy's research which indicated that a five foot -- yes, five foot long -- wire was an adequate receiving antenna for signals from 2 to 30 MHz? A five foot wire can't beam signals like a beam, and it doesn't have high gain like some antennas, but it can suffice for good reception in many instances. And so it's true, at times when the bands are open, just the "alligator wire" described above can give a surprisingly good account of itself.

By the way, don't worry about an antenna tuner. It is doubtful that one would help at all in this sort of application.

attained by hooking the alligator clip to anything metallic except dangerous things like power lines that might possibly capture some radio waves and share them with your receiver via the alligator wire.

Here a whole array of "things" have proved to be "signal grabbers" for various experimentally-minded radio nuts. For instance, the old-timers who remember when beds had "bedsprings" will recall how popular those springs were as an "easy" antenna. Today's generation can still have the thrill of "bedspring radio" by making a tiny slit in the cover of the box-springs under your mattress and letting your alligator bite the outer rim of the metal spring-cage inside.

Ma Bell's Contribution:

Another piece of "bait" for your alligator which is reported to be a good "easy" antenna is connecting to the metal finger-stop on your telephone dial. I don't know if Ma Bell would approve, but I expect she wouldn't mind. However, don't connect directly to the telephone wires: this is dangerous from a couple of electrical perspectives, could cause problems on the phone line, and is probably illegal.

Another way to try to tap the radio waves captured on the telephone lines is to attach the alligator to a piece of sheet metal or metal foil, and sit the phone on the metal. Capacity pickoff to the metal should make this yet another "easy" antenna.

More Alligator Bait:

The list of successfully tried "easy" antennas goes on almost endlessly. Metal window frames, wires laid under the rug, along the ceiling, or along the baseboard in your room, sliding glass-door frames, and metal window awnings have all been used with success. There was an article in a ham magazine a few years back about a person who worked considerable DX using their metal porch roof for an antenna.

Some people have used their motor vehicles -- they're insulated from ground by their tires, you know -- fences, a wire-covered rabbit coop (yes, it's true), and remember last month's reference to the "ice-pick" and "paper-clip" antennas, and also to Kurt Sturba's lawn chair and shopping cart antennas. Don't laugh. He even worked DX with those. Be creative, and enjoy the listening!

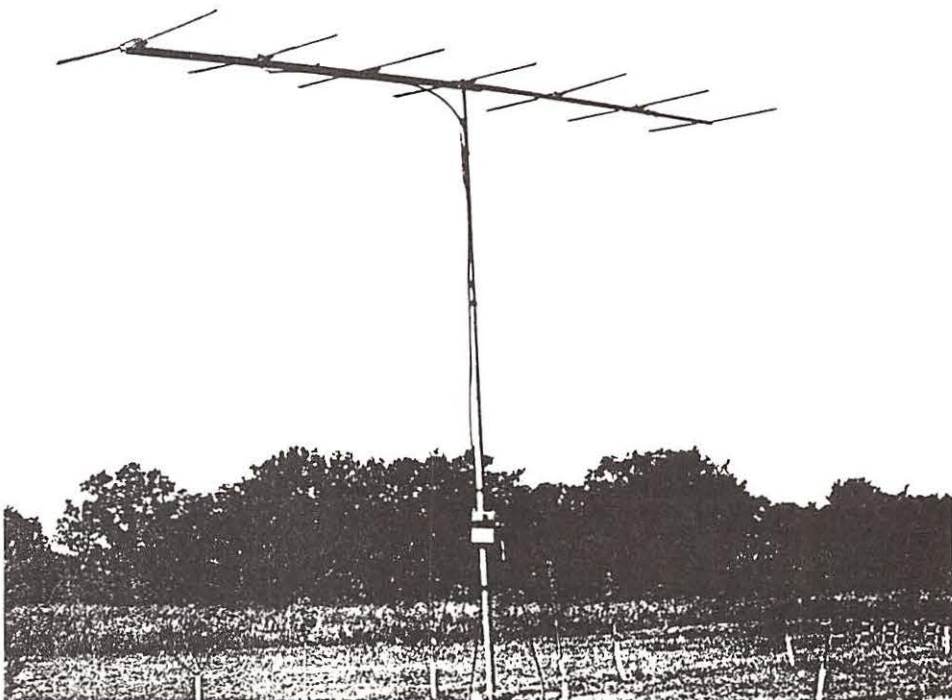


Figure 1: The "Tornado Alley Special"

And in the Next Ring We Have:

The next level of "easy" antennas is

Remember that the time of day at which you listen is important. Some bands are dead at night but full of activity during the day. For others, it is the reverse of this. For lightning safety, if you hook the alligator wire to objects outside the house, disconnect it when not in use and never use it during foul weather.

Speaking of small antennas, *MT* reader Mitch Rosenbaum, WA4KBF, writes that he knows a ham "who, so help me, received music from a local station on his (dental) bridge in his mouth."

Tornado Alley Special:

A while back *MT* reader Bill Bowers wrote me from Chandler, Oklahoma, which he says is in "tornado alley." He had a problem in that he wanted to receive NOAA weather alerts for tornadoes but, due to being 50 miles from the NOAA station, reception was very marginal. His suggestion that lives might well be saved by a good antenna prompted me to design and send him plans for a seven-element Yagi-Uda beam for the NOAA frequency of 162.4 MHz. See Figure 1 for a view of Bill's handiwork on this antenna.

To my delight, Bill wrote back that the antenna "worked great" but he could not compare it to the whip he had tried using before. He had "no data because on the whip there is no signal to measure -- but just fine with the 'Clem' Yagi." I'll send a copy of those plans to any reader who sends me a stamped, self-addressed business envelope. The only cost is that you promise to write back later and tell me how it worked and how many tornadoes you ducked with its help.

Last Month: Last month I asked you if you could come up with the names of actual antennas which sound like: something to eat, something to eat from, something to wear, something to sleep on, and something to keep a pet in. How did you do on this one?

Well, as for eating an antenna, there's a microwave antenna shaped something like a half a round of cheese, and called, reasonably enough, the "cheese" antenna. For an antenna to eat from, everyone has heard of "dish" antennas, the parabolic reflectors so popular today. In terms of something to wear, there's

the "sleeve" dipole and don't forget the "skirt" on the discone and various other vertical antennas. We've already discussed the "bedsprings" antenna. There's also a beam antenna called a "bedspring" antenna due to its slight resemblance to the old-fashioned bedsprings.

Now, as to keeping a pet in an antenna, how about our "rabbit hutch antenna." There's also a ham radio "birdcage" antenna, as well as the old-time "birdcage" method of constructing dipole antennas. For the pet to put in it, why not our own "alligator antenna?"

This Month: If you get into many discussions about antennas, the topic of "SWR" is bound to come up. This is especially true for hams and Cbers, who are very concerned with getting a low SWR with their antenna systems. On the other hand, many people knowledgeable in radio monitoring theory and practice never worry much about the SWR of their antenna system. Why this difference in concern for SWR?

Get an answer to this question, and much more, in your next month's *Monitoring Times*. Till then, Peace, DX and 73.

Q. I am hearing a Spanish language broadcast station at approximately 29.825 MHz on my ICOM receiver. What is it doing there? (Greg Cook, Chico, CA)

A. Although filters are used to reduce them, harmonics from lower-frequency stations often carry long distances, especially the third harmonic which very efficiently matches the impedance of the transmitting antenna. I'd be willing to bet that you are hearing the third harmonic of a 9940 or 9945 kHz Central or South American broadcaster. Tune down there to see if the fundamental (intentional) frequency may be heard at your location.

This common phenomenon is often blamed on intermod, images, "birdies" (spurious signals generated by the receiver's own oscillator) or IF feedthrough. For example, a scanner listener tuning low band (30-50 MHz) in the usual FM mode may hear an "unmodulated" carrier when, in actual fact, he is hearing an AM harmonic from a shortwave broadcaster, but the audio may be undetectable in the FM mode.

Q. How can I disconnect or reduce the volume of the "beep" tone that is injected into my answering machine's recording every few seconds? (Bob Gallardo, San Jose, CA)

A. Similar to scanners with a keyboard "beep" tone, probably a small chip which generates the tone is attached to the input of the audio amplifier. You will need to trace out the chip from a schematic diagram. It will probably have a capacitor and resistor in series connected between the output of the chip and the input of the amplifier.

To stop the tone, simply cut the lead; to make the tone quieter, increase the value of the resistance.

Q. How does a "radar detector" allow police agencies to spot a motorist using a radar detector? (Keith Davis, Windsor, Ont)

A. All receivers—scanner, shortwave, TV, CB, mobile telephone or hi-fi—operate on the basic superheterodyne principle: an incoming radio signal is mixed with a signal generated by the receiver's own oscillator for further processing.

According to Cincinnati Microwave, manufacturer of the famous Passport and

Escort radar detectors, there are four frequencies used by speed radar detectors: 10.525 GHz (X band, the most common and oldest technology), 24.150 GHz (K band, more recently implemented to escape early single-band detectors), 34.300 GHz (Ka band, the Swiss-made photographic units used presently in California and Arizona), and 13.450 GHz (Ku band, FCC-authorized, but presently unused in the U.S.).

It is the radar detector's own 11.550 GHz oscillator which leaks its radiation into the environment, giving away its location when detected by an awaiting law enforcement receiver—the "radar detector detector"—coupled to a directional antenna.

Q. Are there any constitutional grounds to fight being arrested for possessing a speed radar detector in my car in a state in which it is posted as illegal? (Several readers)

A. There may be. One citizen's lobby is making considerable headway in this respect, having a number of court cases overturned throughout the country. For more information, contact RADAR at 4949 Tipp City, OH 45371 (phone 1-513-489-3900). A pamphlet, "Blind Trust" is available for an SASE, and a \$20 membership entitles you to a one-year subscription to the *Radar Reporter*.

Q. Can an oscilloscope be added to a scanner or short-wave receiver to make it a spectrum display unit (spectrum analyzer)? (Bob Bouffard, Rouyn-Noranda, Que.)

A. No. Considerable additional circuitry, including filtered buffer amplifiers, a sweep generator and ramp voltage generator must be provided.

Q. Why has no one come out with a single-sideband adaptor for use with portable radios that only offer AM reception? (David Sage, Boston, MA)

A. Years ago there were such devices, simple tunable oscillators operating near the 455 kHz IF of most portables and set alongside the radios. They didn't prove very popular. SWLs who are interested in such a device may wish to write to us and, if we get enough mail, we will explore making them.

Q. Why is there "dead air" on some shortwave frequencies that remains on for hours without any transmission? (Joseph Johnson, Savannah, GA)

A. This is often done deliberately to discourage others from using it.

Q. Is it possible to add receiver incremental tuning (RIT) to fine tune a scanner for a few kilohertz? (Bob Bouffard, Rouyn-Noranda, Que.)

A. While it is possible, nothing would be gained. The IF filters on scanners are so broad that tuning the signal up or down a few kilohertz would make no noticeable difference in reception.

Q. Can throw-away batteries be recharged? (Harold Bower, Sunbury, PA)

A. Yes, moderately, but nowhere nearly as effectively as rechargeable batteries. The process which produces electricity in "throw-away" (primary) cells and batteries does so by chemical disintegration; the battery is gradually destroyed in the process.

An old trick to get a brief burst of short-term energy from a weak primary cell or battery is to put it in an oven (not a microwave!) for a few minutes, thus increasing its chemical activity. Storing a fresh battery in a refrigerator also lengthens its shelf life by slowing its chemical disintegration.

Rechargeable batteries should be charged at a rate of 10% of their rated current capacity; thus, a 560 milliampere-hour (560 mA) battery would be charged at 56 milliamperes for slightly more than 10 hours. Some newer batteries can withstand a quick charge; they are marked accordingly.

Q. When the Space Shuttle is launched, what frequency does it transmit on? (Steve Craggs, Sarnia, Ont.)

A. Using AM mode, all unclassified Space Shuttle missions may be heard in clear voice on 259.7 MHz (primary) and 296.8 MHz (secondary) as a backup to the S-band (above 2000 MHz) communications. In the early days of Gemini, they used HF single sideband; 15.016 MHz was very popular for monitoring, but shuttle craft are not even equipped with HF radios.

Questions or tips sent to "Ask Bob," c/o MT, are printed in this column as space permits. If you desire a prompt, personal reply, mail your question along with a self-addressed, stamped envelope (no telephone calls, please) in care of MT.

Q. Was the color code for identifying values of electronic components derived from the light spectrum? (David Sage, Boston, MA)

A. Indeed it was, and in order of the color dispersion of white light passing through a prism. Ranging from 0 through 9, the colors are black, brown, red, orange, yellow, green, blue, violet, grey and white.

Q. Can we copy the data bursts which are heard at the beginning of some police transmissions? (Gary Pinkerman, Indianapolis, IN)

A. Sure, if we knew the format and had an appropriate demodulator. Unfortunately, most of these bursts, like those sent from mobile data terminals, are non-standard, proprietary codes and are incompatible among different manufacturers' equipment. They are used for automatic status updates, indicating locations, availability status and the officers on duty in the vehicle. No one has ever reported success in decoding the transmissions which are probably packet ASCII.

Q. What radio networks besides AFRTS use single-sideband to transmit their news feeds and features? (Joseph Johnson, Savannah, GA)

A. Most major international broadcasters—VOA, BBC, Radio Moscow and so forth—still maintain their old shortwave SSB feeder links for backup, but rely primarily on satellite for their news and feature feeds.

Q. Is it possible to install a circuit for the Bearcat BC950XLT so that it will skip over the noise sent purposely by the Quebec Provincial Police, stopping only when the channel is actually occupied with traffic? (Bob Bouffard, Rouyn-Noranda, Que.)

A. The BC950XLT is imported directly from

Japan by Scanner World; it is the same scanner as the BC760XLT sold through regular Uniden dealers. The installation of the tone module and switch will prevent the scanner stopping on any channel that doesn't have the proper CTCSS tone entered. If that tone is sent by the Quebec police only when a voice transmission takes place, it will skip over the channel when the noise is present.

Q. Is it possible to restore 800 MHz on my Regency R1600 scanner? (Paul-Guy Raymond, Roberval, Que.)

A. There seems to be some confusion as to the subject of "restoring" certain frequency ranges in scanners. Two scanner manufacturers, Uniden and Tandy, elected to delete the cellular telephone portion of the 800 MHz band from their scanners to avoid the marketing conflict with their cellular telephone manufacturing.

If your scanner has 800 MHz coverage, but the cellular portion has been deleted at the factory, that portion may be restored as an aftermarket procedure. If there is no 800 MHz band in the scanner to begin with, there is nothing to restore.

Q. I know that aircraft transmissions are in amplitude modulation (AM); how is it possible that I can sometimes hear these voices loud and clear on an FM receiver? (Clifford Powell, Walker Springs, AL)

A. Frequency modulated (FM) receivers have a limiter circuit which prevents AM signals from being detected. But limiters have some tolerance and a slight amount of weak AM may occasionally be heard on strong signals. Additionally, many AM transmitters have a certain amount of unintentional FM on their signals which is detected by the FM receiver.

A corollary to this is that it is possible to hear FM signals on an AM receiver by slightly detuning the receiver off center frequency. This technique, called "slope detection" or "delta demodulation" was used for many years by listeners with older AM radios who wished to hear the newer FM transmissions. It is still effective for monitoring those occasional FM signals above 25 MHz without having to pay for an optional accessory.

A comprehensive list of questions and answers regarding monitoring may be found in Bob Grove's "Scanner and Shortwave Answerbook," \$12.95 plus \$3 shipping from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902.

Itching to Write?

Any hobbyist with some enthusiasm and experience, has something to share. Write the Editor, P.O. Box 98, Brasstown, NC 28902.

ELEVEN METER

COMMUNICATIONS

The newest supplier on the east coast of c.b. radios, scanners, antennas, microphones, radar detectors, coax connectors, telephones, answering machines & mobile accessories.

We carry a complete line of 27 Mhz. equip. and much much more.

catalog \$ 2.00

P.O. Box 3569

Poughkeepsie, n.y.

12603

IMPROVE YOUR HEARING



Hear signals from every corner of the globe! Weak DX stations come in strong!

Big performance and compact size!

Works like a large antenna and "picks up" optimum short-wave reception. COVERS ALL SHORT-WAVE BANDS (0.3-30 MHz). Strong signals with internal 15-12 db amp. Low noise and built-in low pass interference filter. Works with 3 to 20 ft "low profile" antenna wire (supplied). 115VAC powered. Cable to rear NOW INCLUDED (specify connector). ANTENNA PLUS-1 \$30. Scanner and Wide-Band models also available. Call/send for details!

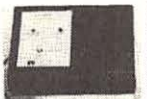
SCANNER STICK

Great Scanner Reception!

Covers all scanner bands 30-1000MHz.

Only 35" long but picks up signals like a vacuum! Ruggedly housed inside a PVC tube it withstands weather that would tear other antennas apart! 25' coax included with either BNC or Motorola conn. For more up to 15' dia. ONLY: \$40

Add our RFP-40-URF SIGNAL INTENSIFIER (\$69.95) for an outstanding receiving system!



Listen to entire nights scanning in minutes! Record only the "ACTION" on your cassette recorder. Connects scanner to recorder. 115VAC or 9V batt. versions available. Easy Connect! TAPE SAVER TS-1 \$59.95!

MasterCard VISA

INTERFERENCE FILTERS: Scanner HPF-1 \$6.95, Short-wave LFF-1 \$19.95. Variable Attenuator VA-20 \$12.95; Ant switch 3 pos \$14.95; Static Bleed \$20.95

Continuous US shipping/handling \$5. AK, HI, PR, Canada shipping/handling \$8. NY and MI residents add local sales tax.

MANY MORE PRODUCTS! SEND FOR DETAILS!

ELECTRON PROCESSING, INC.

BOX 68 -MT

CEDAR, MI 49621

(616) 228-7020

SATISFACTION GUARANTEED!

Order any product from EPI (except software and books) and if not satisfied, return it within 15 days for a full refund (less shipping/handling).

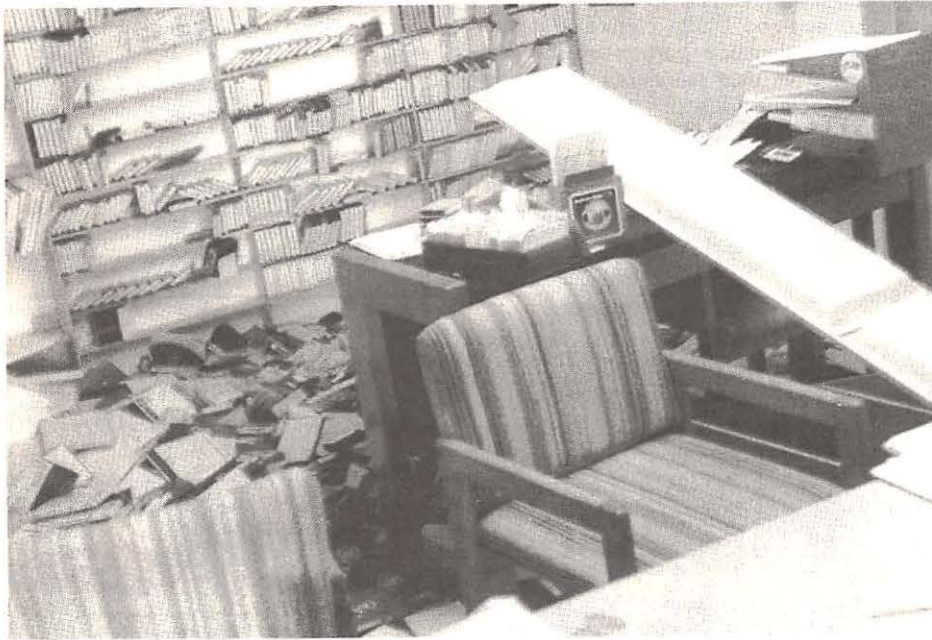
LETTERS

continued from page 3

years. I mean, no kidding. Raise your hands. How many of you were fooled? How many booked flights to the "worker's paradise" after hearing a Radio Tirana broadcast?

The bottom line is this: we'll continue to report on radio. And we'll do the best job we can. That's been our promise for nearly a decade. It still is.

We got a letter and some photos from James Latham at Radio for Peace International (Oh my God, now they're supporting peace!). Costa Rica, where the station is located, was hit by a number of earthquakes late last year. Reported as a 5.5 on the Richter scale, Jim thinks it was closer to a 7.2 -- and he's passed along a handful of photos to prove his point.



R. Dale Bellino from Oneonta, New York, sends along a page from a catalogue and asks if we have "someone on your staff who can tell me about the 'Omnipotent' AM antenna. Could it be as good as it sounds?"

While the name "Omnipotent" is trademarked in the catalogue, the picture they use for an illustration shows a round device clearly imprinted with the name "Select-A-Tenna." We reviewed the Select-A-Tenna in the December 1990 issue. And John Vandlerbeck writes from Las Vegas, Nevada, to concur. Says John in his mini-review, "I have been using [a Select-A-Tenna] for nearly a year. It gives me remarkable DX on medium wave [AM radio] at a modest price! On 1610 kHz I often hear Anguilla, which is about 3,500 miles away."

His conclusion: "It works for me!"

We got a copy of the In-Flight Services briefing bulletin from Northwest Airlines from a reader whose name we'll withhold -- I don't know if this fellow is an employee and whether he'd get in trouble for letting us see it.

The reason why we bring this up is the fact that it addresses the issue of what communications equipment can be used by passengers while a plane is in flight. According to this, flight attendants are reminded that "any device involving aircraft-to-ground communications such as cellular telephones and radios" cannot be used due to possible interference with cockpit electronic devices.

The bulletin goes on to say that

"permissible items" include "calculators, portable computers, cassette tape players, electric shavers, and personal recorders."

No word on listen-only radios, although it's filled with other interesting non-communications-type stuff. For example, crew is told that Northwest's new 747-400's are being delivered with deactivated reading lights in the aft crew bunk area. Apparently, there was a report of a "smoldering blanket left unattended touching an illuminated light."

Northwestern advises crew to read by flashlight until the problem is solved.

C. Clifford Coffman reviews a feature of the Sony ICF-2010 that he hopes no one else will have to test.

"The apartment building where I had been living was recently destroyed by fire. Firefighters deluged the building and my radio desk with thousands of gallons of water.

"Two days after the fire, the landlord's son, rummaging through the ruins, came across the '2010. 'Give it a chance,' he said. 'Let it dry out.'

"Three days later I turned on the radio. And praise God, the Creator of the radio waves, the Sony ICF-2010 functioned excellently!"

"In *Monitoring Times* I have read the criticisms of the ICF-2010. As far as I'm concerned, my only problem with this excellent receiver is that I cannot be awake every night to DX the world with it."

Thanks, Clifford. One caution here: the reason why this radio remains the topic of so many "fine tooth comb" discussions is because it is so popular and *wonderful* a receiver.

As a professional monitoring tool, I find it indispensable.

Steve, who signs no last name but says that he lives in New York City, writes to congratulate us on the timeliness of our publication saying that it's unusual for a magazine to have only a 2 month turn-around time "from closing to mailing."

We appreciate the compliment, Steve, but we're better than that. In some cases, *MT's* turn-around time is a mere two to three weeks.

John Engelman sends along a copy of *Life* magazine's special edition entitled, "Classic moments" (Fall, 1990). On page 58 is a picture of President George Bush and his wife in bed, surrounded by grandchildren. To the left of the President's head is an ominous-looking red phone, reminiscent of the one a Chief Executive might use to call down a nuclear strike on some unfortunate victim. To the right is -- yes -- a shortwave radio, a Sony ICF-2003.

Says John, "Your readers may be interested to know that the President shares our hobby."

We'd heard for some time that Mr. Bush takes an occasional swing across the shortwave dial as do many heads of state. These people, world leaders, regularly tune the shortwave bands in order to get that special edge that "world band" gives.

Now, if only we could get Mr. Bush to write an article.

Richard Ashley of Salt Lake City writes to comment on the sale of "Superpower KUSW." Says Richard, "[Station owner] Ralph Carlson sold the station for 2.5 million dollars -- not bad when you consider that he only invested 1.2 million to get it on the air. However, from the beginning, KUSW was losing money, never attaining even full 24-hour-a-day operation."

CONVENTION CALENDAR

Date	Location	Club/Contact Person		
Mar 2	Absecon, NJ	Shore Points ARC/SPARC/ Rbt Webb WA2YSA P.O. Box 142, Absecon, NJ 08201	Mar 24	Grosse Pte Woods, MI SE Mich ARA/ Thomas Orlicki N8HLY 15835 Novara, Detroit, MI 48205
Mar 3	Dover, PA	Pen-Mar ARC, Keystone VHF Club, Hilltop Transmitting Soc, Southern PA Comm Group/ John Shaffer 2596 Church Rd, York, PA 17404	Mar 22-24	Kulpsville, PA Winter SWL Fest/ PO Box 591/ Colmar, PA 18915
Mar 9-10	Charlotte, NC	Roanoke Div Conv/ W.Reed Whitten AB4W 1208 Oxford Place, Cary NC 27511 Location: Charlotte Merchandise Mart, 2500 E. Independence Blvd; \$6 preregistration or \$8 at the door; More info call 704-536-7373. Talk-in 145.29 MHz.	Mar 22-24	Kearney, NE Midwest Div Conv/ Timothy Lowenstein WA0IVW 409 E 25th, Box 998 Kearney, NE 68848-0998
Mar 10	Indianapolis, IN	Morgan Co Rpt Assoc/ Aileen Scales KC9YA 3142 Market Place, Bloomington, IN 47403	Apr 5-7	Kansas City, MO MO Stater Convention/ Chuck Miller WA0KUH 7000 NE 120th St, Kansas City, MO 64166
Mar 15-17	Orlando, FL	Fia State Conv/ John Lenkerd W4DNU 1046 Turner Rd, Winter Park, FL 32789	Apr 6	Little Rock, AR AR State Conv/ Bob Hancock KB5IDB 6116 Nicole Dr, N. Little Rock, AR 72218
Mar 16	Scottsdale, AZ	ARCA Spring Hamfest/ Allen Sklar AA7BJ P.O.Box 10878, Scottsdale, AZ 85271-0878, 602-491-0802	Apr 7	Charleston, WV Charleston Area Hamfest/ Wm Kibbler K8WMX 182 Monterey Dr, St. Albans, WV 25177
Mar 16	Flemington, NJ	Location: Scottsdale Community College, Pima and Chapparel Rd.; Admission \$2 per car. Talk-in 147.18/147.78 and ZIA Link. Cherryville Rptr Assoc/ Marty Grozinski KS2K 6 Kirkbride Rd, Flemington, NJ 08822	Apr 6-7	Timonium, MD Baltimore ARC/ Jim Schmidt, N3FFB 5 Bantry Ct, Baltimore, MD 21237
Mar 17	Maumee, OH	Location: Hunterdon HS Fieldhouse, RT 31 and 523. \$4 advance/\$5 at the door. Talk-in 147.975/147.375 duplex and 146.520 simplex. [908] 806-6944 or [908] 788-4080.	Apr 12-14	Visalia, CA Int'l DX Convention/ Edwin Stephenson W6MKM 230 West 42nd Ave, San Mateo, CA 94403
Mar 17	Sterling, IL	Toledo Mobile RA/ Bernie Fine WD8C 11014 Obee Rd, Whitehouse, OH 43571	Apr 12-13	Warner Robins, GA Central GA ARC/ Jessie4 Kirkham WB4KQA 110 Brown Dr, Warner Robins, GA 31093
Mar 16-17	Ft Walton Bch, FL	Sterling-Rock Falls ARS/ Susan Peters KA9GNR 511 8th Ave, Sterling, IL 61081	Apr 13	Lebanon, PA Appalachian Amateur Rptr Group/ Homer Luckenbill WA3YMU 105 Walnut St, Pine Grove, PA 17963
Mar 23	Marietta, GA	Playground ARC/ Clair Fisher N4QWX 616 Burgundy Ln, Ft Walton Bch, FL 32548	Apr 14	Rockford, IL Rockford ARA/ Joe Roling N9HEZ 5850 Strathmore #3, Rockford, IL 61107
Mar 24	Trenton, NJ	Kennebec ARC/ Jane Walls KB4QKX 1097 Seven Springs Cir., Marietta, GA 30068	Apr 14	Raleigh, NC Raleigh ARS/ Chuck Littlewood K4HF 2005 Quail Ridge Rd, Raleigh, NC 27609
Mar 24	Madison, OH	Delaware Valley RA/ Paul Collins N2JLP 118 Grant Ave, Hightstown, NJ 08520-4104	Apr 21	Wellesley, MA Talk-in on 146.04/64 and 146.28/88 Wellesley ARS/ Gerard Driscoll NV1T 101 Whiting Way, Needham, MA 02192
		Lake County ARC/ Scott Farnham KO8O 10418 Briar Hill, Kirtland, OH 44094	Apr 21	Sullivan, IL Moultrie AR/ Ralph Zancha WC9V 502 E State St, Lovington, IL 61937
			Apr 26-28	Dayton, OH Dayton ARA/ William Schmid WD8LOI 820 Dartmouth Rd, Troy, OH 45373

Monitoring Times is happy to print announcements of events open to our readers. Send your announcements at least 60 days before the event to: Monitoring Times Convention Calendar, P.O. Box 98, Brassstown NC 28902.

Mr. Carlson, like many commercial shortwave station owners had great dreams. They just didn't work out, for one reason or another. Why? The answer is unknown; however, the most puzzling question is why Mr. Carlson chose to use the station to broadcast rock music. This isn't an esthetic criticism, rather, a practical one. Is there anyplace in North America where you can't hear rock on FM or, if not, AM radio? So why rock? Guess we'll never know.

You know, I still wonder what would have happened if Jeff White had been able to continue with Radio Earth five or six years ago. That wasn't a big financial success, either. But it sure was fun to listen to.

Rosalie White, Educational Activities Manager at the American Radio Relay League writes to tell us that during next month's shuttle launch, all five crew members are ham radio operators. This increases your chance of tuning in STS-37. Keep your ears open. We'll try to get frequencies, although NASA never seems to release them until literally days before the launch.

It seems fair to give both sides equal time, so after printing Ken Greenberg's "Why would anyone want to monitor fast food restaurants?" letter, we feel obliged to give space to Robert Eisner and Joseph Hayes, III.

We came in contact with these two fellows some years ago and since then they've become the undisputed leaders in this arcane aspect of

monitoring. (Yes, we were joking when we told you about the Garage Door Opener Monitoring Association last month. We are not joking this time.)

Robert and Joseph take this very seriously, investing "many miles and hours of research" to produce "a list of paired frequencies used by various headset manufacturers."

"We have determined a pattern between 457 and 467 MHz and have confirmed 8 of 9 frequencies pairs in this range," they say. "There may also be some type of pairing between 462 and 467 MHz but as of this time have only been able to confirm one of them."

Does all of this whet your appetite? Robert and Joseph are offering copies of their *Beginners Guide to Fast Food Frequency Monitoring*, which runs an amazing 5 single-spaced typewritten pages and includes dozens of frequencies arranged by restaurant, for sale through DX Radio Supply for \$3.00 (cash) and a self-addressed, stamped envelope. The address is P.O. Box 360, Wagontown, PA 19376.

Let's close with a very special story.

Looking for a way to honor his fellow columnists at *Monitoring Times*, last year at the *Monitoring Times* convention in Knoxville, Tennessee, Uncle Skip (who is one of our staffers now serving in Operation Desert Storm) introduced the first *MT* Columnist of the Year Award. The prize, a very dirty, very heavy, obviously very used, 1944 Radiomarine Corporation of America AR-8506-B receiver

(also known as a "boat anchor"), had been moldering away in Skip's flood-prone basement for years. Displayed at the convention, it received its share of snickers, especially when the bulky radio threatened to overturn the head table where it was displayed.

In any case, the recipient of the prize, frequency manager Greg Jordan, spent the convention fighting the flu, and was unable to accept this prestigious prize. No one heard any more about the radio.

Like the Hollywood celebrity who years later turns up at a Skid Row mission, the AR-8506-B hit bottom last month, appearing in "Bob's Bargain Bin" (page 101). For free. All is not lost, though, and this time-honored award may yet still be saved. Apparently there were no takers for the AR-8506-B.

Will the 80 pound award-radio find its way back to the 1991 *Monitoring Times* convention in Knoxville next fall? We can only hope and pray.

We'd like to hear your comments, opinions, and experiences concerning the world of radio. Please understand that personal replies are not always possible.

Letters should be addressed to Letters to the Editor, Monitoring Times, P.O. Box 98, Brassstown, NC 28902. Please include your name and address (may be withheld at your request).

STOCK EXCHANGE

NON-COMMERCIAL SUBSCRIBER
RATES: \$.25 per word - *Subscribers only.*
 All ads must be paid in advance to *Monitoring Times*.

All merchandise must be personal and radio-related.

COMMERCIAL RATES: \$1.00 per word payable with ad

1-3/4" SQUARE DISPLAY AD: \$35 per issue, payable in advance. Send camera-ready copy or copy to be typeset (reverse type not available).

Ads for Stock Exchange must be received 45 days prior to the publication date.

Monitoring Times assumes no responsibility for misrepresented merchandise.

INDEX OF ADVERTISERS

ACE Communications	95
Advanced Electronic Technologies	17
Airliners	49
Antennas West	9,29,54
Ashton ITC	57
C.Crane Company	11
Cellular Security Group	5
Communications Electronics	21
CQ Communications	89
CSRA	23
Datametrics	43
DX Computing	11
DX Radio Supply	3
Eagle's View	91
Electron Processing	99
Electronic Equipment Bank	13
11-Meter Communications	99
Excellent Technology	23
Franklin Video	57
Future Scanning Systems	9
Galaxy Electronics	97
GRE America	79
Grove Enterprises	25
Hunterdon Aero Publishers	45
ICOM America	Cover IV
J & J Enterprises	5
Japan Radio Company	83
Just Tee's'n	47
Klingenfuss Publications	35
MilSpec Communications	43
Monitoring Times	91
OPTOElectronics	Cover II, III
Palomar Engineering	51
Radio Electronics	71
Software Systems Consulting	41,53
Somerset Engineering	27
Spec-Com	89
Startek	39
The WSYI Group	9,41
Tiare Publications	17
Universal SW Radio	93
WICOM	5

When readers are in the market, they look here to find your ad ... Will it be here?

THE EXCHANGE! REMOTE BULLETIN BOARD SYSTEM. RADIO CONFERENCE, FREQUENCY LISTINGS, SCANNER MODIFICATIONS. FREE ACCESS. [904] 878-4413. 300-9600 BAUD. MENTION MT!

FOR SALE: SGC SG-715 PORTABLE HF MANPACK with all accessories plus-MBO, NDH-95 SCANNER/TIMER (FOR NRD 92/93 RECEIVER)-MBO.

UNIVERSAL M-7000 with options, new - \$950. 2 ACE AR33 FM HANDHELD RECEIVERS and accessories - \$150 each. MX-5000 SCANNER, new - \$325. MX-5000, used - \$175. DAIWA CNA 2002 2.5KW AUTO TUNER-MBO, MFJ-989 3KW MANUAL TUNER-MBO. HORIZON LTD MARINE BASE STATION, new - \$250. YAESU FT103R with accessories-MBO. KENWOOD TH-21AT with accessories - MBO. Will ship UPS COD (PRE-PAID) only, Call John 305-253-1299 5:30-7:00 P.M. EST.

YOUR NEW ANTENNA. We build CUSTOM SWL antennas, slopers, Windoms, beams, multi-band. Quality-simplicity. \$37-\$79. Write: CAD, 2425 Jackson Parkway, Vienna, VA 22180.

OFFERED PEANUTS FOR YOUR TRADE-IN RIG? I PAY CASH! RADIO RECYCLERS, 3221 W. LINCOLN AVE., MILWAUKEE, WI 53215 [414] 383-9001.

SONY ICF 2010/2001D FILTER MODS. WIDE FILTER REPLACEMENT WITH INSTRUCTIONS. KIWA ELECTRONICS [509] 453-KIWA, 612 South 14th Ave, Yakima, WA 98902.

MAKE \$\$\$! BECOME AN AMERICAN ELECTRONICS DEALER! Profit opportunities since 1965. Call Dave Wainscott 1-800-872-1373.

SCANNER FREQUENCY SEARCH SERVICE. Hear all there is to hear! SASE to: HEALD, 6886M Jefferson, North Branch, MI 48461.

PANASONIC RF-B600 receiver, mint, manual, box - \$260. MICRODEC DECODER - Decodes Morse, RTTY, and ASCII to alphanumeric characters - \$125. John [716] 693-5290.

KENWOOD R-600 Receiver Factory Checked - \$285. [619] 459-5527.

SONY ICF-SW1S shortwave system kit, complete, mint condition - \$175. David [208] 245-2070.

ICOM R-7000 receiver. Excellent condition with manual - \$825 firm. Complete FCC Microfiche by frequency, call and state, also list of U.S. ships-recent, in metal storage box - \$100. Bill Menke, 923 E. State St., Ithaca, NY 14850.

PRO 2005 all mods mint condition, 5 yr warranty - \$275. Call Robert [704] 867-8175.

BEARCAT 950 XLT, mobile/base, 100 channel scanner, with cellular, like new - \$120 or trade for PRO2005 or 2006. Philip [615] 982-8380.

Selling JRC NRD/525 mint condition - \$1000 firm. Hollywood. Phone/FAX [213] 662-1069, Henry.

Individuals needed to record radio stations in California. Will pay! Write: P.O. Box 51554, Durham, NC 27717.

YOU AIN'T HEARD NOTHIN...YET!

Largest selection of scanner frequency guides (federal, military, police, aero, etc.); AM/FM/TV broadcast directories; HF "ute" directories; Books on espionage, covert ops., bugging, wiretapping, surveillance, clandestine radio, & more!
BIG FREE CATALOG!

CRB RESEARCH
 P.O. Box 54-MT
 Commack NY 11725

Don't Buy a Portable Scanner or SW Receiver!

That is, if you want to use it around your house, yard or neighborhood. our new FM WIRELESS SPEAKER RELAY will let you listen to your base (or mobile) scanner or SW receiver on any FM broadcast radio. Monitor with the performance of your base for less than the price of a portable! Auto shut-off, appx. 1/10 mi. range. Complete, easily-assembled kit: \$27.95. 75% assembled kit: \$34.95. Add \$3.50 shipping. Other products available, send SASE for info.

Worldcomm Technology
 P.O.Box 3364
 Ft. Pierce, FL 34948 [407] 466-4640

801-SCAN

Computer-Controlled Scanning for the ICOM R7000 or R9000

Transform your ICOM into the Ultimate Scanning Receiver! Add real bank switching, advanced auto-search, begin and/or end-signal timers. Load/read Icom memories. And much more. Compare demo programs before you decide! Requires IBM/compatible with 640K, DOS 2.1+ Program from \$94.95, interface from \$59.95 or use your own. Demo \$2.50 (check or M.O.) Free information! Please specify receiver.

801-SCAN
 397 Dal-Rich Village #212
 Richardson, TX 75080

HUGE 88 PAGE CATALOG

- Shortwave Receivers
- Amateur Radio Gear
- Scanners
- RTTY & FAX Equipment
- Books & Accessories

Send \$1 to **Universal Radio**
1280 Aida Drive
Reynoldsburg, OH 43068

Communication at its best

Low prices on Scanners, CBs, Radar Detectors, Phones, Ans. Machines and Accessories. AR-900 234, HR2515 249, 9XL 133, 19plus 69.

Free Shipping V/MC.

TURBO ELECTRONICS

P.O. Box 8034
Hicksville, NY 11802
Questions welcomed. [516] 938-1946

INDOOR ANTENNAS

INDOOR HF BROADBAND ANTENNAS:

Higher average signal levels across HF bands than your receivers telescoping whip. A vertical antenna you hang from a curtain rod.

CPL-102A 22 Lg X 2 Dia \$29.95

CPL-102B 36 Lg X 2 Dia \$39.95

HOUSE WIRING ANTENNA COUPLER:

Allows capacitive coupling to house AC wiring (no direct connection) for use as longwire HF receiving antenna. Comes with feed line and adapter cable. Works great in apartments.

CPL-104 \$24.95

Send Check or money order to
CHILTON PACIFIC LTD
5632 Van Nuys Blvd. # 222
Van Nuys, CA 91401

(Add \$3.50 Shipping/Handling to all orders)

THE MAP

DX 'ability!



The MAP improves your receiver's SELECTIVITY and AUDIO QUALITY without modifications

- Easy To Install
- Wide and Narrow Bandwidths
- Synchronous Detection
- Works with 455 kHz IF receivers

KIWA

612 South 14th. Av. Write or call
Yakima, WA 98902
509-453-1KIWA for information

PC SOFTWARE by W2XQ

English Language SWBC Schedules*
Utility DXer's Logbook
Receiver Control Programs
(JRC, Kenwood)

Download info from Pinelands RBBS
(609) 859-1910 - 24/12/3 @ 8N1
or send SASE for catalog

TRS Consultants

PO Box 2275-MT
Vincentown, NJ 08088-2275
(609) 859-2447

* Winner of a 1989 Industry Award from the World Radio TV Handbook



twenty-five cents

Would you pay twenty-five cents if it would help you hear more stations? One quarter (cash only) is all it takes to get one of the most comprehensive book catalogues in the radio business.

DX Radio Supply, P.O. Box 360,
Wagontown, PA 19376. We're books.
Only books. And we do it better.

BUGGED? WIRETAPPED?

Find out fast! Factory direct countermeasures equipment catalog \$1.

CAPRI ELECTRONICS

P.O. Box 589A
Bayfield, CO 81122
(303) 884-9084

PC SCANNING LOGBOOK

Never lose information on a frequency again!

SCANLOG

Keeps track of all your loggings
Various report printing formats
Super fast search/retrieval techniques
Loaded with features
IBM/comp. 512K. Indicate 5.25" or 3.5"

\$35+3.50 s/h US check/MO/COD
Or a SASE for more information

Amar Rafat Custom Software
P.O. Box 691123
STOCKTON, CA 95269

CB RADIO OWNERS!

We specialize in a wide variety of technical information, parts and services for CB radios, 10-Meter and FM conversion kits, repair books, plans, high-performance accessories. Thousands of satisfied customers since 1976! Catalog \$2.

CBC INTERNATIONAL

P.O. Box 31500MT, Phoenix, AZ 85046

Radio for Peace International T-Shirts!

Blue, Green,
Yellow design on

White T-Shirt

\$15.00 each ppd.
specify size(s):

M, L, XL



RADIO FOR PEACE INTERNATIONAL

P.O. BOX 10869-C
EUGENE, OREGON 97440

NEW MOD FOR PRO-2004/5/6

DATATONE SQUELCH mod from the author of the Scanner Modification Handbook! Stop your PRO-2004/5/6 from lockup on useless data & tone signals! Simple mod auto-resumes Scan & Search within one second after stopping on data or tone signals but operates normally on voice signals! Defacing scanner not required; works with and turns on/off by standard Sound Squelch function.

+ Plans & schematic diagram ----\$9.95
+ Handcrafted wired/tested board w/plans & instructions ----\$29.95
+ Other scanner mods & tech services
+ Information only -- send a #10 SASE

COMMTECHS ENGINEERING
PO BOX 262478-RT SAN DIEGO, CA 92196

PRO-2004/5/6

Search and Store Modules

• Automatically find elusive frequencies. Internal no-holes installation, keyboard control, retain all present functions.

• Dual-mode Power Model PS-90 stores in the main memory channels with a DIP switch adjustable limit to 255 channels or only in the ten monitor ch. - \$44.95

• Model SS-45, Ten monitor ch. - \$24.95

Wired/Tested/Postpaid (US & Canada)
US checks or MO in US\$. NC add tax

KEY RESEARCH

POB 846M, CARY, NC 27512-0846

ALL TELEPHONE, FAX, CELLULAR, USERS NEED THIS MANUAL

SAVE \$\$\$'s, EVEN \$\$\$'s, ON YOUR TELEPHONE BILLS. REVEALS OVER 200 INSIDER, GOVERNMENT, BUSINESS, SECRETS, PROVEN SUCCESSFUL IN BOTH THE U.S. AND CANADA. INCLUDES FREE 'TRACKER' PERFORMANCE FORM. ORDER NOW.

ONLY \$ 19.95 PPD.

STS SERVICES, 7889 DROLET STREET,
MONTREAL, QUEBEC H2R 2C2 CANADA
NO RISK - MONEY BACK GUARANTEE

CODE SCANNER

Copies Coded Radio Signals



MICROCRAFT CORPORATION
P.O. Box 513, Thiensville, WI 53092
Telephone (414) 241-8144



Ontario Scanner Frequency Directory

New 430 page directory! 11,600 large easy to read listings. Most accurate, up to date information available. An invaluable reference book. Only \$21.00 plus \$3 postage (Ontario residents add \$1.92 tax).

CANSCAN

P.O. Box 3009, Tecumseh PS
Windsor, Ontario N8N 2M3

RADIO NEW YORK

INTERNATIONAL

Dedicated to global awareness of our environment and the promotion of world peace and understanding

Broadcasting Sundays
9:00 pm to 1:00 am EST
on 7520 kHz

Radio New York International
Box 270, Flushing, NY 11352
718-961-7435

LOOP ANTENNAS! Broadband, shielded loops for LF or AM DX'ing.

36" Outdoor loop \$169.95
12" Desktop loop \$149.95
12" Handheld loop \$159.95
shipping xtra: check or MO
Interceptor Electronics Inc.

Route 1 Box 439
Round Hill, VA 22141
(703) 338 4905

Calling All Stamp Collectors!

Announcing A Special Limited Edition
Cacheted Cover Commemorating
National Shortwave Radio Week
March 11-17, 1991
First in a Series of Topical Covers
Commemorating Great Moments in Radio

The Radio Collection Topical Society
PO Box 149, Bircroft Manor, NY 10510

\$2.00 per Cover plus an SASE or FREE with
Annual Society Membership at \$12.00
(Orders must be submitted by 3/1/91)

Membership includes a Newsletter featuring collecting tips and updates on new US and foreign radio-related issues, covers and cancellations. Also available to members are discounts on philatelic accessories, software & more!

DISCOVER THE FUN. JOIN US TODAY!

Member, American Topical Association

*** FREE CATALOG ***

Latest scanner and short-wave books, accessories product info & discount prices on select items. Send for FREE catalog:

Firecom Communications
Post Office Box 61-C
New York, NY 10011

Phone (212) 989-5773

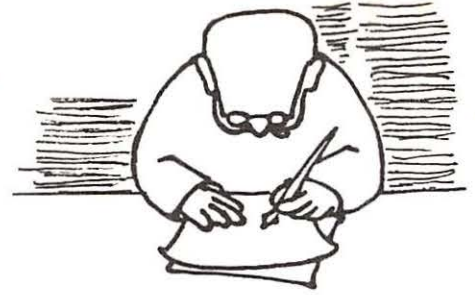
PAN-COM INTERNATIONAL CATALOG

From Amplifiers to Zappers! Over 350 Kits, Plans & Books about Licensed/Unlicensed AM/FM/Cable broadcasting, Ham/CB/SW/lowfer/medfer, surveillance, phone devices, software, MORE. Send \$1.00!

PO Box 130-T
Paradise CA 95967

Closing Comments

Eavesdropping



Recently, *MT* has been getting considerable press. Associated Press picked up stories from the Raleigh and Charlotte *Observer* where they were followed in rapid progression by *USA Today*, the *Miami Herald*, the *Boston Globe*, *London Times* and many others. There has been a flood of interviews from radio news and talk shows and even TV magazine programs like *Entertainment Tonight*, *America Tonight*, *20/20*, *Hard Copy*, *Prime Time* and *CNN*.

The front-page feature in the *Wall Street Journal* piqued the most interest by the press and the public in monitoring and the issue of privacy. But it was the intensive interview by *CNN* which caused me to review my feelings about the whole privacy issue.

I am not, by the way, an eavesdropper, a snoop who spends my idle hours hunting for titillating telephone conversations. In fact, I don't; I value the privacy of my neighbors and know that they honor mine as well. Still, the mail poured in from inquisitive readers.

What are the most vulnerable targets, the "private" devices which may be overheard by scanners? Cordless and cellular telephones and wireless baby monitors head the list, followed by walkie-talkies, wireless microphones, wireless intercoms, RF intrusion alarms, radio/TV oscillators and computer local area networks (LANs).

Crimes as minor as receiving unauthorized stock tips and credit card numbers and as malignant as murder and rape could be abetted by overhearing the appropriate conversation. Blackmail, kidnapping, burglary, assault -- most crimes could have an advantage given such readily-accessible information.

One sleazy business called "competitive intelligence" sells its eavesdropping services to the highest bidder. Want some information on a business? They know how and where to listen in. But there are laws.

In 1934 Congress enacted the Communications Act, a remarkably farsighted piece of legislation which created the Federal Communications Commission and anticipated monitoring, warning those who do so not to reveal the contents of the messages nor use the information for personal gain. The law is a good one; it recognizes the right to private communications as well as the impossibility of policing listeners, and it has resulted in numerous prosecutions of flagrant violators.

On the other hand, the Electronic Communications Privacy Act (ECPA) of 1986 is an embarrassing piece of legislation, filled with contradictions and inconsistencies, defying constitutional rights, begging for its first test case in court. Several attorneys have offered their services to get this law changed or even struck down.

ECPA was commercially contrived by the wealthy lobby of the Cellular Telecommunications Industry Association (CTIA) to legitimize their marketing ploy that cellular car phones are somehow more private than other forms of personal communications. In fact, more people listen to cellular telephones now than ever before, largely because of the publicity stirred by the ECPA.

Enforcement is impossible; scanning enthusiasts joke about the imaginary "cellular police" lurking in the bushes just outside the listener's window, waiting to spring upon hearing a car phone on the scanner's speaker.

The consequence of violating this preposterous law, however, is not a joke; it is outrageous. The punishment certainly doesn't fit the "crime." A scanning hobbyist convicted of a single offense could face a year in prison and a \$100,000 fine just for overhearing, "Honey, I'm picking up a loaf of bread on the way home" from some nameless caller miles away. A second offense? Five years in prison and another \$100,000 fine!

What is private about a radio transmission? How can the privacy of an unidentified caller be compromised? Who would charge a hobbyist who tunes across an uninvited radio signal in the privacy of his own home? Would a cellular "watchdog" committee bring charges as a class action? What would be the charges without a victim? What, besides an admission of guilt by the defendant, could constitute proof that a crime had been committed? Would a court-ordered surveillance be justified to determine the times, frequencies and messages monitored by a suspect?

Our privacy is invaded for commercial exploitation on a daily basis by wealthy conglomerates--like the cellular industry--who have access to our financial records, credit and social security information, and other personal details. Mail and telephone solicitors get our names from central data banks which sell details about us to their clients; yet who complains about this egregious intrusion into our privacy?

We all deserve to have our rights, including those to privacy, respected and protected. But these expectations must be reasonable. We don't deserve to have our freedoms withdrawn to subsidize Madison Avenue marketing of radio telephones.

Ignorance of the law is no excuse to commit an infraction. Ignorance of the public airwaves should be no excuse to blame someone else for overhearing you. The cellular telephone industry has steadfastly refused to put the responsibility of privacy protection where it belongs: on themselves. They have refused to include inexpensive, privacy-assurance devices in their phones and they have refused to prominently warn their

clients that they will be overheard, even though it is morally incumbent upon them to do so. It should be legally mandated.

Instead, they place the blame on the recreational monitor who will stumble across those clear voice transmissions and, if the subject is interesting, he is likely to listen, just as he would to any interesting police, fire, aircraft, amateur or other communication. It is human nature to be interested in the drama of other human lives.

An analogy is tempting: A blind man walking naked through a crowd is sure to draw attention; he should be cautioned to put on clothes. If a person elects to broadcast his voice over a radio transmitter, he should expect to be heard by the crowd. If he is "blind" to that fact, he should be cautioned to properly attire his conversation! If we don't want to be heard, we shouldn't speak in front of others.

The FCC recognizes that many of the frequencies used for mobile telephone communications are also used by other services; it is lawful for anyone to own a wide-frequency receiver which includes cellular frequencies. Manufacturers who exclude cellular frequency coverage do so because they also manufacture cellular telephones and can tell their customers that scanners do not tune in cellular calls.

Regrettably, the American Civil Liberties Union (ACLU) plans to support new legislation protecting cordless phones and baby monitors as well as cellular. Rather than recognizing that none of these radio transmitters can reasonably expect privacy, ACLU is urging "protection" for all of them!

In days past we laughed at the peeping Tom, the little old lady with her ear horn pointed at the neighbor's window, the boy with his ear pressed against a wall. Yet these were all active, intrusive forms of eavesdropping; radio monitoring is not. The scanner listener doesn't have to do anything different to hear mobile or cordless telephones than he would to hear police calls.

Mobile telephone signals penetrate our homes and our bodies and, while there is considerable evidence that electromagnetic radiation is a health hazard, we are prevented from monitoring those signals.

With digital systems expected to scramble mobile phones within a few years, the privacy issue will take care of itself. But in the meantime, we wouldn't put blinders on a crowd, and we shouldn't have to put plugs in scanner hobbyists' ears.

Bob Grove, WA4PYQ
--Publisher



PUT THE PC10 IN YOUR PC FOR MORE COUNTER POWER.



Model PC10 Universal Counter Timer Board for the PC. Introductory Price \$339.

The PC10 has on board 50 ohm RF input with amplifiers and prescalers to operate as a stand alone 1MHz to 2.4GHz RF counter. TTL level input signals can be connected directly to the miniature 25 pin D connector on the mounting bracket. For low frequency, high impedance inputs, the Model AP10H companion amplifier must be used.

Model AP10H Dual High Impedance Amplifier Head Unit (Not Shown). Introductory price \$299.

The AP10H is the companion head unit that supports all PC10 Universal Counter functions from 10Hz to 100MHz with 1 megohm inputs. Input attenuators, low pass filters and trigger levels are software selectable.

Options: TCXO 10 Precision Temperature Compensated Time Base \$195. $\pm 0.2\text{ppm } 20^{\circ}\text{-}40^{\circ}\text{C}$, 1ppm - year aging.

OPTOELECTRONICS does it again - phenomenal power, performance and price.

This is what sets our PC Based Universal Counter apart from any other counter available on the market today...

- Instant Direct Tune - Set a communications receiver such as ICOM R7000 to frequency detected by counter. Patent pending.
- Data logging and data file creation to keep records or measure frequency drift.
- Menu selection for Units includes CPM/RPM, Hz, KHz, MHz, GHz, Sec, mS, uS and nS.
- Software timebase calibration of 1ppm TCXO timebase.
- Windows 3.0 operating environment with fully developed operating and signal conditioning controls accessible through pull down menus.

In addition to these unique features, PC10 is a down right high performance counter...

- 10 digit 10Hz to 2.4GHz frequency range.
- Measurement Period (Gate Time) continuously variable from 1 milli-second to 28 seconds.
- Reciprocal Counting for high resolution measurement.
- Input sensitivity is less than 10mV from 10Hz to over 1.6GHz.
- Direct count frequencies over 200MHz with 1Hz resolution in 1 sec.

OPTOELECTRONICS

Toll Free Order Line: 1-800-327-5912

FL(305)771-2050 • FAX(305)771-2052

5821 NE 14th Avenue • Fort Lauderdale, Florida 33334



YOU EXPECT THE WORLD FROM ICOM RECEIVERS

ICOM's IC-R71A and IC-R7000 are the professional's choice for receiving international broadcasts, aircraft, marine, business, emergency services, television, and government bands. These people demand the finest in communications and so do you. ICOM puts the world at your fingertips with the IC-R7000 25-2000MHz* and IC-R71A 0.1-30MHz commercial quality scanning receivers.

Incomparable Frequency Control.

Both the IC-R71A and IC-R7000 feature **direct frequency access** via their front keypad, main tuning dial, optional infrared remote control and/or computer interface adapter. **Incredible Flexibility!**

Full Coverage, Maximum Performance.

The superb IC-R71A is your key to world-wide SSB, CW, RTTY, AM and FM (optional) communications plus foreign broadcasts in the 100kHz to 30MHz range. It features IF Notch, low noise mixer circuits and a 100db dynamic range. The pacesetter **IC-R7000** receives today's hot areas of interest, including aircraft, marine, public services, amateur, and satellite transmissions in the 25MHz

to 2000MHz* range. It includes **all mode operation** low noise circuits plus outstanding sensitivity and selectivity. The IC-R71A/R7000 combination is your window to the world!



The IC-R71A is a shortwave listener's delight. Its **32 tunable memories** store frequency and mode information, and they are single-button reprogrammable **independent of VFO A or VFO B's operations!** Dual width, an adjustable noise blanker, panel selectable RF preamp, and selectable AGC combined with **four scan modes** and all-mode squelch further enhance the IC-R71A's HF reception!

The IC-R7000 features 99 tunable memories and **six scanning modes**. It even scans a band and loads memories 80 to 99 with active frequencies without

operator assistance! Additional features include selectable scan speed pause delays, wide/narrow FM reception and high frequency stability.

Options. IC-R7000: RC-12 remote control, EX-310 voice synthesizer, CK-70 DC adapter, MB-12 mobile bracket. IC-R71A: RC-11 remote control, EX-310 voice synthesizer, CK-70 DC adapter, MB-12 mobile bracket, FL-32A 500Hz, FL-63A 250Hz and FL-44A filters.

See these quality ICOM receivers at your local authorized ICOM dealer today.

*Specifications of the IC-R7000 guaranteed from 25-1000MHz and 1250-1300MHz. No coverage from 1000-1025MHz.

ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004
Customer Service Hotline (206) 454-7619
 3150 Premier Drive, Suite 126, Irving, TX 75063
 1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
 ICOM CANADA, A Division of ICOM America, Inc.,
 3071 - #5 Road, Unit 9, Richmond, B.C. V6X 2T4 Canada

All stated specifications are subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. Receivers 89



ICOM

First in Communications